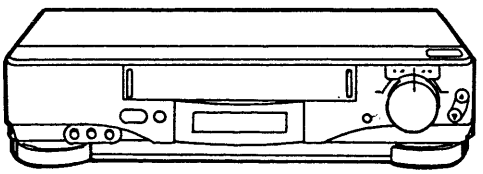
HITACHI

SERVICE MANUAL



TK	No. 4706E

VT-FX624A

US MECHANISM

The VT-FX624A VCR is similar to the previous VT-FX613A. This service manual includes only differences from the VT-FX613A described in the previous VT-FX610A/FX611A/613A manual (No.4601E). For complete information on the VT-FX624A, also refer to the No. 4601E, manual. A US MECHANISM is used for the VT-FX624A mechanical block.
For repair and maintenance of the mechanism, refer to the service manual, US MECHANISM (No.4527E).

Manuals to be referred VT-FX624A.

Name of manual	Manual No.
VT-FX610A/FX611A/FX613A	4601E
US Mechanism	4527E

VHS

This video deck is a VHS type video recorder. For proper operation, only the VHS type cassette must be used.

VCR Plus+ w/Cable Channel Changer

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO CASSETTE RECORDER

March 1997 Image & Information Media Systems Division, Tokai

SAFETY PRECAUTIONS

NOTICE: Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis.

1. When replacing a chassis in the instrument, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment covers/shields, isolation resistors/capacitors, etc.
2. When service is required, observe the original lead-dress. Extra precautions should be taken to assure correct lead dress in the high voltage circuit.
3. Always use the manufacturer's replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacturers'. Furthermore, where a short-circuit has occurred, replace those components that indicate evidence of overheating.
4. Before returning an instrument to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective or inadvertently defeated during servicing. Therefore, the following checks should be performed for the continued protection of the customer and service technician.

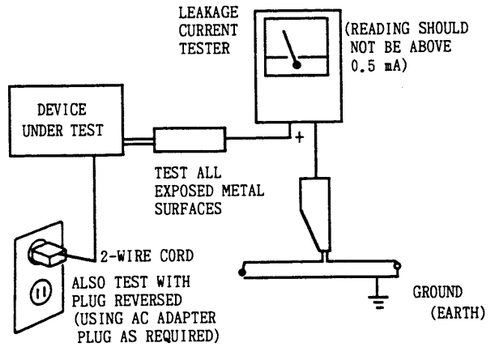
Leakage Current Cold Check

With the AC plug removed from the AC120V, 60Hz source, place a jumper across the two plug prongs. Turn the AC power switch on. Using an insulation tester (DC500V), connect one lead to the jumpered AC plug and touch the other lead to exposed metal parts (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of 0.3 Mohm and a maximum resistor reading of 5 Mohm. Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a AC120V, 60Hz outlet (do not use an isolation transformer for this check).

Turn the AC power switch on. Using a "Leakage Current Tester", measure for current from all exposed metal parts of the cabinet (antennas, screwheads, metal overlays, control shaft, etc.), particularly an exposed metal part having a return path to the chassis, to a known ground (earth) (water pipe, conduit, etc.). Any current measured must not exceed 0.5 mA.


LEAKAGE CURRENT TESTER
(READING SHOULD NOT BE ABOVE 0.5 mA)
DEVICE UNDER TEST
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
GROUND (EARTH)

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE UNIT TO THE CUSTOMER.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts have special safety-related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for a higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual. Electrical components having such features are identified by marking with a ⚠ on the schematics and the parts list in this Service Manual. The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards. Product safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies for, HITACHI Service Manual may be obtained at a nominal charge from HITACHI SALES CORPORATION.

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CHAPTER 2 DISASSEMBLY

For CHAPTER 2 DISASSEMBLY, refer to the VT-FX613A section of the VT-FX610A/FX611A/FX613A manual (No.4601E).

CHAPTER 3 ELECTRIC CIRCUIT ADJUSTMENT

For CHAPTER 3 ELECTRIC CIRCUIT ADJUSTMENT, refer to the VT-FX613A section of the VT-FX610A/FX611A/FX613A manual (No.4601E).

CHAPTER 4 EXPLODED VIEWS

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CHAPTER 6 SCHEMATIC AND CIRCUIT BOARD DIAGRAMS

SCHEMATIC AND CIRCUIT BOARD DIAGRAMS

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SHUTTLE SWITCH (SHU)	6-3 /	6-18
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MECHANISM SENSOR (MAS)	6-6 /	6-20
CYLINDER MOTOR DRIVE	6-7 /	-
CAPSTAN MOTOR	6-7 /	-
MTS/JACK (MAS)	6-8 /	6-20
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CHAPTER 7 TROUBLE DISPLAY, BLOCK DIAGRAMS AND MICROPROCESSOR PIN FUNCTION TABLES

For CHAPTER 7 TROUBLE DISPLAY, BLOCK DIAGRAMS AND MICROPROCESSOR PIN FUNCTION TABLES, refer to the VT-FX613A section of the VT-FX610A/FX611A/ FX613A manual (No.4601E).

CHAPTER 1 GENERAL INFORMATION

Specifications

Format:	VHS
Video Signal System:	NTSC color EIA standard
Record/Playback System:	Video: 4 Heads
	Audio: VHS Hi-Fi stereo record/playback system
Tape Speed:	33.35mm/sec(SP), 16.67mm/sec(LP)(playback only),
	11.12mm/sec(EP)
RF Input:	UHF/VHF75 ohm
Tuner:	USA: 181 channel tuning ability* (125 cable channels)
	Canada: 178 channel tuning ability* (122 cable channels
Type:	Auto programming frequency synthesis
Power Input:	AC120V 60Hz
Power Consumption:	22W norminal
Cabinet Size:	14-15/16″ (W)×3-11/16″ (H)×10-15/16″ (D)
	38.0cm(W)×9.3cm(H)×27.9cm(D)
Weight:	7.7lbs. (3.5kg)
Storage Temperature:	-4° F to 131° F
Operating Temperature:	41° F to 104° F
Accessories:	1 coaxial cable
	1 remote control unit
	2AA batteries

Design and specifications subject to change without notice.

Comparison with Previous Model

	Item	VT-FX624A	VT-FX610A/FX611A/FX613A
Video	Video recording/playback system	VHS	VHS
	Y/C separation	Comb filter	Comb filter
	YNR (noise reduction)	○	○
	CNR (noise reduction)	×	×
	Picture quality function	×	×
	Color edge clean circuit	×	×
	Vertical chroma correction	×	×
	New sync circuit	○ (PB)	○ (PB)
	Picture control	×	×
	S-VHS quasi playback function	×	×
Jacks	Video/audio inputs (rear)	1／1	1／1
	Video/audio inputs (front)	1／1	1／1
	Video/audio outputs (rear)	1／1	1／1
	Video/audio outputs (front)	×	×
Prog.	VCR Plus + programming	○	○
	Number of timer programs	8 programs/1 year	8 programs/1 year
	Auto recording speed	×	×
Remote	Model	VT-RM613A	VT-RM611A (FX610A/FX611A) VT-RM613A (FX613A)
	Remote jog/shuttle	×／○	×／○(FX613A)
	VCR Plus + code guide channel memory	×	×
Miscellaneous	Auto clock setting	○	○(FX611A/FX613A)
	Jog/Shuttle dial on the VCR	×／○	×／○(FX613A)
	Cable box control	○	○(FX613A)
	Tape navigation	×	×
	Closed caption	×	×
	Self-diagnosis	○ (6 modes)	○ (6 modes)
	No. of channels	181	181
	Backup time	1 hour	1 hour
	Front display (display tube)	LCD	LCD
Mechanism	Synchro input jack	×	×
	Basic chassis type	US	US
	Fast forward/rewind time (with T-120)	about 120 seconds	about 120 seconds
	Configuration of heads	DA4 heads + HiFi SP video : 2 〔48/56μm〕 EP video : 2 〔19/19μm〕 Audio : 2 〔28/28μm〕	DA4 heads + HiFi SP video : 2 〔48/56μm〕 EP video : 2 〔19/19μm〕 Audio : 2 〔28/28μm〕
	Material of heads	SP video : Ferrite EP video : Ferrite Audio : Ferrite	SP video : Ferrite EP video : Ferrite Audio : Ferrite
	Head cleaning roller	○	○

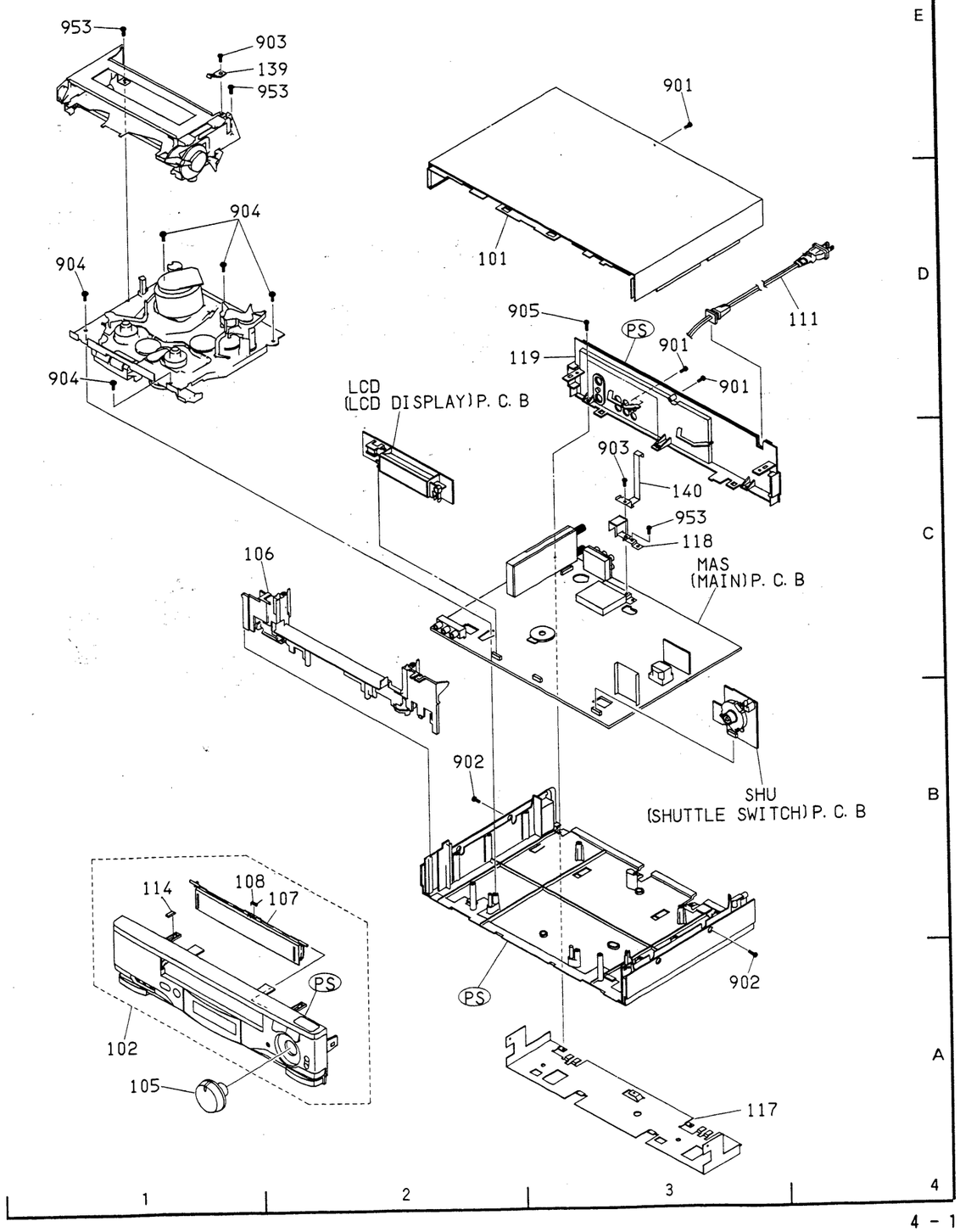
Comparison of Main Control ICs

Item	Function	VT-FX624A	VT-FX610A/FX611A/FX613A
Video	Y/chroma signal processing	HA118203F (IC201)	HA118203F (IC201)
	CCD 1H delay	MSM7470-72MS-KR1 (IC202)	MSM7470-72MS-KR1 (IC202)
	FM signal processing/EQ	Included in IC201	Included in IC201
	Linear Phase EQ/NAVI.data adder	Included in IC201	Included in IC201
FM audio	Audio signal processing	AN3964FB (IC501)	AN3964FB (IC501)
Preamp	Video head switch	HA118198F (IC1101)	HA118198F (IC1101)
	Audio head amp	LA7256 (IC1102)	LA7256 (IC1102)
MTS/OSD	MTS decoder	HTS7337 (IC1801)	HTS7337 (IC1801)
	OSD control/Sync separator/AFC	Included in Main μP	Included in Main μP
Servo	Servo control	Included in Main μP	Included in Main μP
	FG/tach amp	Included in Main μP	Included in Main μP
System control	Main μP (system control μP)	HD6433977SA70F (IC901)	HD6433977SA70F HD6433977SA66F (IC901)
	VCR-EEPROM	ST24C02 (IC903)	ST24C01 [FX610A/FX611A] (IC903) ST24C02 [FX613A] (IC903)
	Loading motor drive	BA6209 (IC904)	BA6209 (IC904)
Timer	Timer μP	Included in Main μP	Included in Main μP
	Display driver	BU9716K (IC1701)	BU9716K (IC1701)
	Auto Clock	LC7455A (IC2901)	LC7455A (IC2901)
Power supply	5V regulator	M5278L05 (IC905)	M5278L05 (IC905)

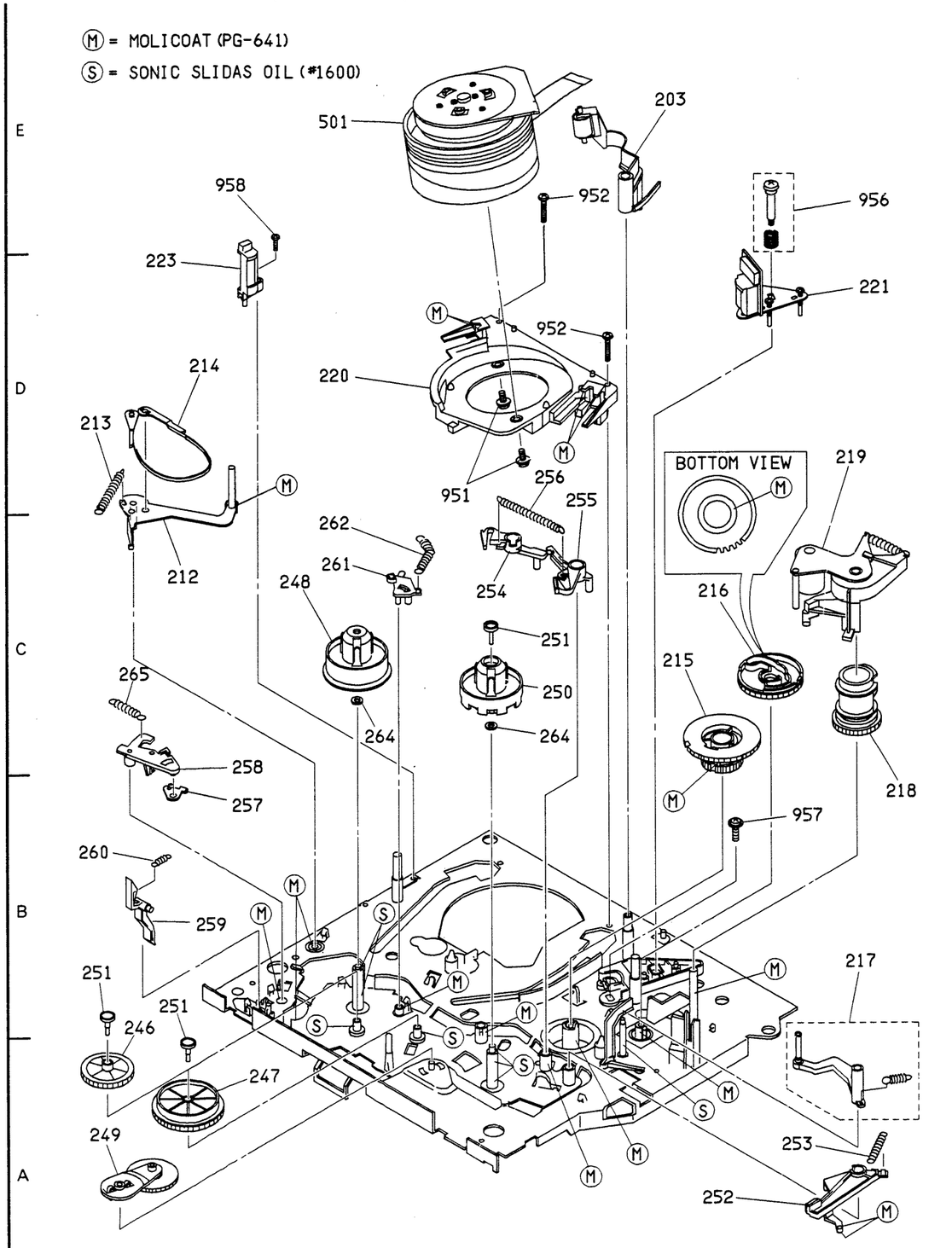
CHAPTER 4 EXPLODED VIEW

1. CABINET SECTION

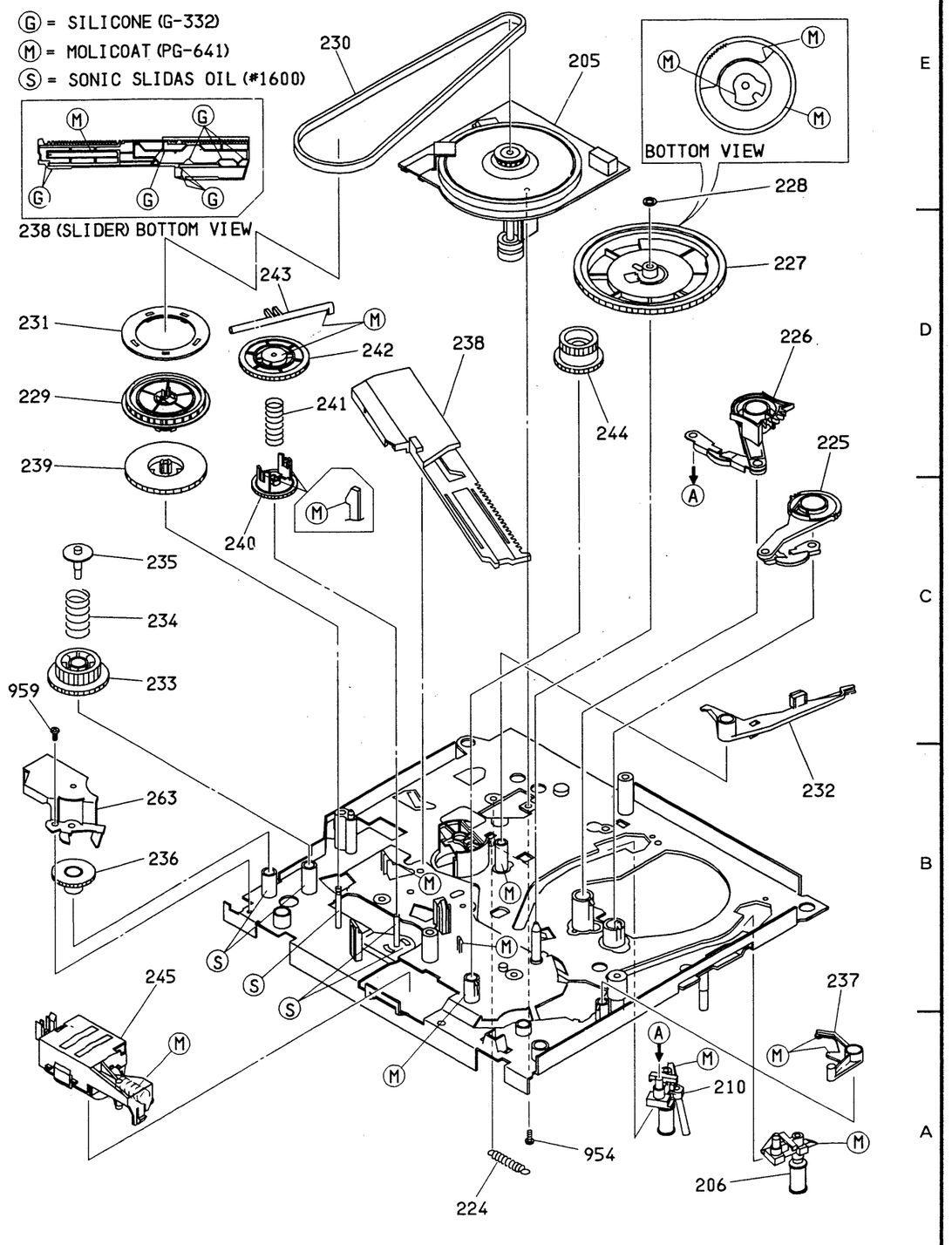
NOTE : The synthetic resin members that can be dismantled are shown by abbreviations using letters.



2. US-MECHANISM (TOP VIEW) SECTION

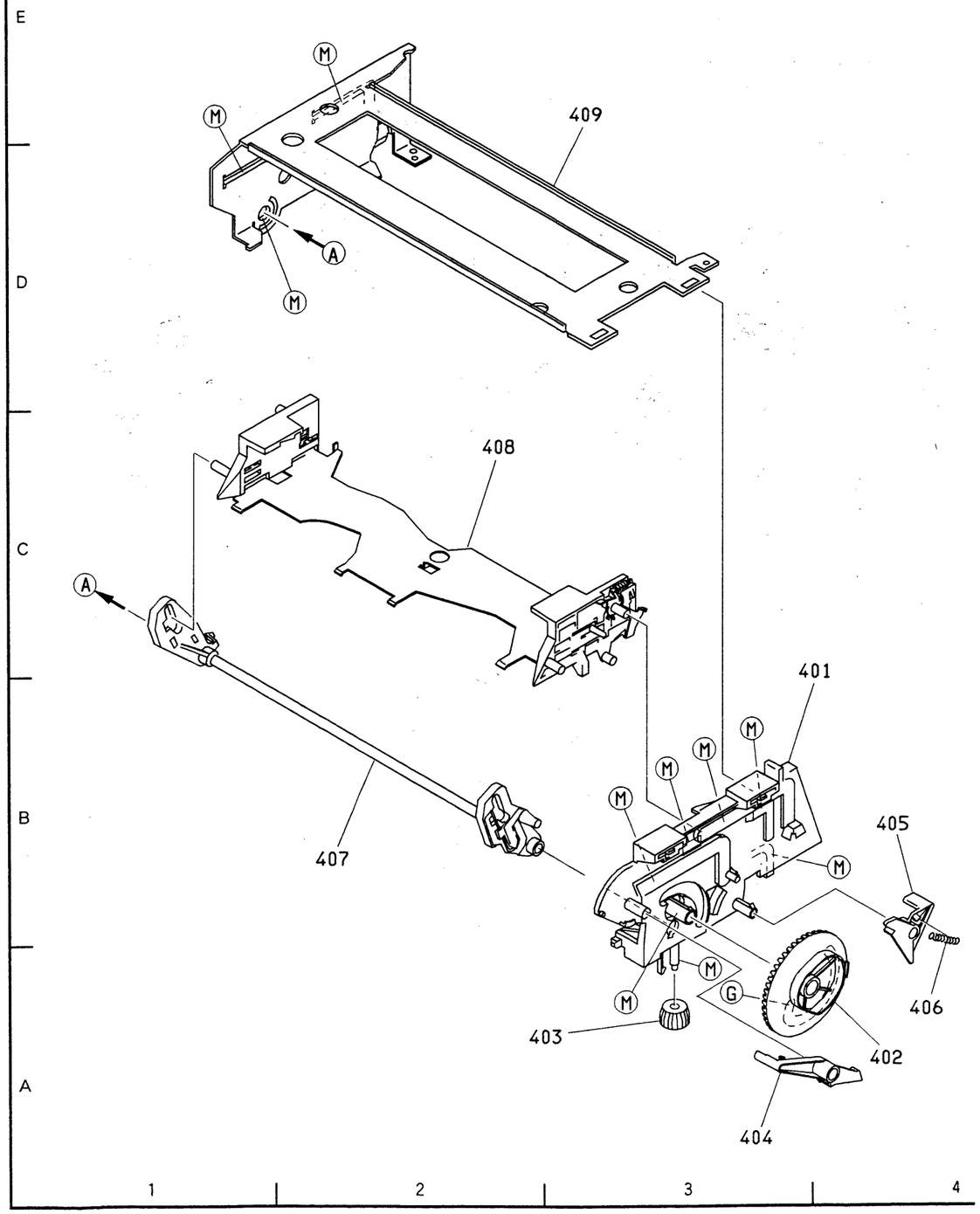


3. US-MECHANISM (BOTTOM VIEW) SECTION



4. US-FL MECHANISM SECTION

Ⓜ = MOLICOAT (PG-641)
Ⓖ = SILICONE (G-332)



CHAPTER 5 REPLACEMENT PARTS LIST

1. MECHANICAL PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION
		MECHANISM SECTION
101	QA11161	COVER, TOP (HEPM)
102	PH15531	PANAL, FRONT (HEPM)
105	PC11912	KNOB, SHUTTLE (HEPM)
106	NT10483	PIECE, FRONT (HEPM)
107	PH13321	DOOR, CASSETTE (HEPM)
108	KL11451	SPRING, DOOR (HEPM)
⚠111	EV10271	CORD, POWER (HEPM)
114	MQ10199	CUSHION, RUBBER
117	QA11141	COVER, BOTTOM
118	MD11281	COVER, CBA
119	PH13241	PANEL, REAR (HEPM)
139	4826834	SPRING, EARTH
140	MD11602	PLATE, EARTH
203	KX11661	CLEANING, HEAD
205	GP10252	MOTOR, CAPSTAN
206	KX12294	BASE, GUIDE ROLLER (I)
210	KX12302	BASE, GUIDE ROLLER(O)
212	KX11531	ARM, TENSION
213	KL10662	SPRING
214	KX11631	BAND, TENSION
215	KF10641	GEAR, DRIVE
216	KF10701	GEAR, IDLER
217	KX12661	ARM, OUT
218	KX11581	GEAR, SPIRAL
219	KX11553	ARM, PINCH ROLLER
220	KX11451	BASE, CYLINDER
221	KX11941	AC HEAD
223	5423082	FE HEAD
224	KL10711	SPRING
225	KX11591	GEAR, LOADING (L)
226	KX11611	GEAR, LOADING (R)
227	KF10673	GEAR, CAM
228	4344643	WASHER
229	KX11443	PULLEY
230	KX11522	BELT
231	KF10631	FLANGE
232	KX12031	BRAKE
233	KF10571	GEAR, CHANGE
234	KL10771	SPRING
235	KX12001	STOPPER, SPRING
236	KF10561	GEAR, IDLER
237	KX11831	ARM, OPERATION
238	KX11362	SLIDER
239	KF10551	GEAR, TRANS
240	KF10501	GEAR, DRIVE
241	KL10773	SPRING
242	KF10513	GEAR, CHANGE
243	KX11411	ARM, CHANGE
244	KX11371	GEAR
245	KX11892	MOTOR, LOADING
246	KF10521	GEAR, IDLER 1
247	KF10532	GEAR, IDLER 2
248	KH10152	REEL, TABLE (S)
249	KX11423	ARM
250	KH10161	REEL, TABLE (T)
251	KX11991	STOPPER
252	KX11861	BRAKE
253	KL10782	SPRING, BRAKE
254	KX11875	BRAKE, L
255	KX11883	BRAKE, R
256	KL10792	SPRING, BRAKE
257	KF10542	GEAR, JOG
258	KX13132	ARM, JOG
259	KX11841	ARM, REC
260	6542482	SPRING
261	KX11811	BRAKE, SUB
262	KL10903	SPRING, SUB
263	KX12461	BRACKET, BASE
264	MN11571	WASHER
265	KL11062	SPRING, JOG
401	KX11772	BRACKET (R)
402	KF10682	GEAR 1
403	KF10691	GEAR 2
404	KX11751	ARM, DOOR
405	KX11761	ARM, SWITCH
406	6323723	SPRING
407	KX11931	ARM, DRIVE
408	KX11921	HOLDER, CASSETTE
409	KX11741	BRACKET (L)
501	HX10295	CYLINDER ASSY (CY-U6N1)
901	8699410	SCREW (3X10)
902	8679408	SCREW (3.0X8)
903	8671306	SCREW (2.6X6)
904	7781132	BT SCREW
905	7784323	SCREW (3X8)
951	8652408	SCREW (PSW3X8)
952	0671310	DT SCREW-2.6MMDX10MM
953	0671306	DT SCREW 2.6MMDX6MM
954	8691306	BT SCREW 2.6MM
956	KX12443	SCREW
957	MJ10341	SCREW (M2.6)
958	0671308	DT SCREW-2.6MMDX8MM
959	0671305	DT SCREW-2.6MMDX5MM
		ACCESSARIES
802	EW10251	CORD, RF
803	HL10631	REMOTE HAND SET (VT-RM613A) (HEPM)

2. ELECTRICAL PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION
		CAPACITORS
C0201	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0203	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0204	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0205	0893031	CERAMIC CHIP 1000PF+-10% 50V
C0206	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0208	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0209	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0211	0800138	ELECTROLYTIC 47UF 6.3V
C0212	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0213	0254458	ELECTROLYTIC 3.3UF+-20% 50V
C0214	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0215	0800115	ELECTROLYTIC 3.3UF 50V
C0216	0209948	CERAMIC CHIP 330PF+-5% 50V
C0218	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C0219	0893031	CERAMIC CHIP 1000PF+-10% 50V
C0220	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0221	0800112	ELECTROLYTIC 2.2UF 50V
C0222	0893039	CERAMIC CHIP 4700PF+-10% 50V
C0223	0800118	ELECTROLYTIC 4.7UF 35V
C0224	0890015	CERAMIC DISC 33PF+-50% 50V
C0225	0890026	CERAMIC DISC 220PF+-10% 50V
C0226	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C0227	0800107	ELECTROLYTIC 0.47UF 50V
C0228	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0230	0893002	CERAMIC CHIP 0.033UF+-10% 16V
C0233	0800122	ELECTROLYTIC 10UF 16V
C0234	0800185	ELECTROLYTIC 47UF 6.3V
C0235	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0236	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0237	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0238	0800178	ELECTROLYTIC 4.7UF 35V
C0239	0800179	ELECTROLYTIC 10UF 16V
C0240	0800179	ELECTROLYTIC 10UF 16V
C0241	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0242	0800178	ELECTROLYTIC 4.7UF 35V
C0243	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0244	0254455	ELECTROLYTIC 0.47UF+-20% 50V
C0245	0800177	ELECTROLYTIC 3.3UF 50V
C0246	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0247	0209936	CERAMIC CHIP 33PF+-5% 50V
C0249	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0251	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0252	0209944	CERAMIC CHIP 150PF+-5% 50V
C0254	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0255	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0256	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0260	0209933	CERAMIC CHIP 18PF+-5% 50V
C0262	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0263	0209931	CERAMIC CHIP 12PF+-5% 50V
C0264	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0265	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0273	0209937	CERAMIC CHIP 39PF+-5% 50V
C0402	0800117	ELECTROLYTIC 4.7UF 25V
C0403	0893002	CERAMIC CHIP 0.033UF+-10% 16V
C0404	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0406	0893037	CERAMIC CHIP 3300PF+-10% 50V
C0407	0800122	ELECTROLYTIC 10UF 16V
C0408	0800122	ELECTROLYTIC 10UF 16V
C0409	0209906	CERAMIC DISC 820PF+-5% 50V
C0410	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0411	0800109	ELECTROLYTIC 1.0UF 50V
C0412	0800101	ELECTROLYTIC 0.1UF 50V
C0413	0800101	ELECTROLYTIC 0.1UF 50V
C0414	0800109	ELECTROLYTIC 1.0UF 50V
C0420	0204337	CAPACITOR FILM 2700PF+-5% 100V
C0421	0890026	CERAMIC DISC 220PF+-10% 50V
C0422	0800335	ELECTROLYTIC 220UF 16V
C0424	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0427	0893037	CERAMIC CHIP 3300PF+-10% 50V
C0428	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0429	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C0434	0800117	ELECTROLYTIC 4.7UF 25V
C0435	0893033	CERAMIC CHIP 1500PF+-10% 50V
C0501	0800297	ELECTROLYTIC 22UF 6.3V
C0502	0800287	CAPASITOR 4.7UF+-20% 35V
C0503	0800287	CAPASITOR 4.7UF+-20% 35V
C0504	0800118	ELECTROLYTIC 4.7UF 35V
C0506	0800308	ELECTROLYTIC 33UF 16V
C0507	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0508	0800112	ELECTROLYTIC 2.2UF 50V
C0509	0800143	ELECTROLYTIC 100UF 6.3V
C0510	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0511	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0512	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0513	0800139	ELECTROLYITC 47UF 10V
C0514	0893013	CERAMIC CHIP 0.22UF+-10% 16V
C0517	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0518	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0519	0800143	ELECTROLYTIC 100UF 6.3V
C0520	0800112	ELECTROLYTIC 2.2UF 50V
C0521	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0522	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0524	0800118	ELECTROLYTIC 4.7UF 35V
C0525	0800118	ELECTROLYTIC 4.7UF 35V
C0526	0800118	ELECTROLYTIC 4.7UF 35V
C0528	0880048	MYLAR 0.022UF+-10% 50V
C0529	0800122	ELECTROLYTIC 10UF 16V
C0530	0800291	ELECTROLYTIC 10UF 16V
C0531	0800291	ELECTROLYTIC 10UF 16V
C0532	0800317	ELECTROLYTIC 47UF 16V
C0533	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0534	0800135	ELECTROLYTIC 33UF 16V
C0535	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0601	0207453	ELECTROLYTIC 2.2UF 50V
C0602	0880018	POLYESTER FILM 0.22UF+-10% 50V
C0605	0890094	CERAMIC DISC 3300PF+-10% 25V
C0606	0893031	CERAMIC CHIP 1000PF+-10% 50V
C0607	0209938	CERAMIC CHIP 47PF+-5% 50V
C0608	0890022	CERAMIC DISC 100PF+-10% 50V
C0609	0800179	ELECTROLYTIC 10UF 16V
C0610	0800141	ELECTROLYTIC 47UF 16V
C0611	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0612	0800128	ELECTROLYTIC 22UF 16V
C0614	0890035	CERAMIC DISC 1000PF+-10% 50V
C0615	0800317	ELECTROLYTIC 47UF 16V
C0620	0890035	CERAMIC DISC 1000PF+-10% 50V
C0621	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C0622	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0623	0890043	CERAMIC DISC 0.01UF+-20% 16V
C0624	0890044	CERAMIC DISC 0.022UF+80-20% 25V
⚠C0851	AN10201S	FILM CAPACITOR 0.1UF+-20% 250V
⚠C0859	0235992	CERAMIC DISC 2200PF 250V
⚠C0860	0235992	CERAMIC DISC 2200PF 250V
C0862	AL10192	ELECTROLYTIC 100UF 200V
C0864	AJ10134R	CERAMIC CAPACITOR 270PF+-10% 500V
C0865	0204284	ELECTROLYTIC 0.047UF 250V
C0866	0880053	POLYESTER FILM 0.047UF+-10% 50V
C0867	0880037	MYLAR 0.0033UF 50V
C0868	0880035	POLYESTER FILM 0.0022UF+-10% 50V
C0870	0254403	CAPACITOR 22UF+-20% 50V
C0871	0254405	CAPACITOR 1000UF+-20% 25V
C0872	0800354	ELECTROLYTIC 470UF 25V
C0873	0254406	CAPACITOR 3300UF+-20% 10V
C0874	0800354	ELECTROLYTIC 470UF 25V
C0875	0880044	POLYESTER FILM 0.01UF+-10% 50V
C0876	0800308	ELECTROLYTIC 33UF 16V
C0878	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C0882	0800047	ELECTROLYTIC 100UF 6.3V
C0885	AJ10131R	CERAMIC CAPACITOR 470PF+-10% 500V
C0886	0890035	CERAMIC DISC 1000PF+-10% 50V
C0888	1143004	CERAMIC CHIP 150PF+-5% 1KV
C0901	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0902	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0904	0217516	CAPACITOR 0.047UF+80-20% 5.5V
C0906	0800176	ELECTROLYTIC 2.2UF 50V
C0907	0209927	CERAMIC CHIP 7.0PF+-0.5% 50V
C0908	0209927	CERAMIC CHIP 7.0PF+-0.5% 50V
C0909	0209932	CERAMIC CHIP 15PF+-5% 50V
C0910	0209932	CERAMIC CHIP 15PF+-5% 50V
C0912	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0913	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0914	0800308	ELECTROLYTIC 33UF 16V
C0915	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0916	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0917	0800141	ELECTROLYTIC 47UF 16V
C0918	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0919	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0920	0209938	CERAMIC CHIP 47PF+-5% 50V
C0922	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0923	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0924	0209938	CERAMIC CHIP 47PF+-5% 50V
C0925	0209938	CERAMIC CHIP 47PF+-5% 50V
C0926	0209935	CERAMIC CHIP 27PF+-5% 50V
C0927	0209948	CERAMIC CHIP 330PF+-5% 50V
C0928	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0940	0209943	CERAMIC DISC 120PF+-5% 50V
C0942	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C0972	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0980	0890043	CERAMIC DISC 0.01UF+-20% 16V
C0981	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0982	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0983	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C0984	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C0985	0209904	CERAMIC DISC 560PF+-5% 50V
C1102	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1103	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1104	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1105	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1106	0800185	ELECTROLYTIC 47UF 6.3V
C1107	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1108	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1110	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1111	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1112	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1114	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1115	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1116	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1117	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1118	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1119	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1120	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1121	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1122	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1123	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1124	0893031	CERAMIC CHIP 1000PF+-10% 50V
C1125	0800185	ELECTROLYTIC 47UF 6.3V
C1126	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1127	0893013	CERAMIC CHIP 0.22UF+-10% 16V
C1128	0800185	ELECTROLYTIC 47UF 6.3V
C1129	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1131	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1134	0209930	CERAMIC CHIP 10PF+-0.5% 50V
C1135	0209930	CERAMIC CHIP 10PF+-0.5% 50V
C1136	0209930	CERAMIC CHIP 10PF+-0.5% 50V
C1137	0209935	CERAMIC CHIP 27PF+-5% 50V
C1138	0209943	CERAMIC DISC 120PF+-5% 50V
C1140	0209938	CERAMIC CHIP 47PF+-5% 50V
C1141	0893031	CERAMIC CHIP 1000PF+-10% 50V
C1401	0890043	CERAMIC DISC 0.01UF+-20% 16V
C1402	0209943	CERAMIC DISC 120PF+-5% 50V
C1403	0800118	ELECTROLYTIC 4.7UF 35V
C1404	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1405	0890043	CERAMIC DISC 0.01UF+-20% 16V
C1409	0209937	CERAMIC CHIP 39PF+-5% 50V
C1410	0209937	CERAMIC CHIP 39PF+-5% 50V
C1411	0209945	CERAMIC DISC 180PF+-5% 50V
C1414	0800122	ELECTROLYTIC 10UF 16V
C1415	0800118	ELECTROLYTIC 4.7UF 35V
C1416	0800317	ELECTROLYTIC 47UF 16V
C1417	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1419	0209930	CERAMIC CHIP 10PF+-0.5% 50V
C1424	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C1425	0209931	CERAMIC CHIP 12PF+-5% 50V
C1426	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C1427	0890039	CERAMIC DISC 4700PF+-20% 16V
C1428	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1701	0800185	ELECTROLYTIC 47UF 6.3V
C1702	0890103	CERAMIC DISC 47000PF+80-20% 12V
C1703	0890103	CERAMIC DISC 47000PF+80-20% 12V
C1704	0890103	CERAMIC DISC 47000PF+80-20% 12V
C1705	0890035	CERAMIC DISC 1000PF+-10% 50V
C1706	0800185	ELECTROLYTIC 47UF 6.3V
C1802	0800291	ELECTROLYTIC 10UF 16V
C1811	0800317	ELECTROLYTIC 47UF 16V
C2101	0890035	CERAMIC DISC 1000PF+-10% 50V
C2102	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C2501	0890038	CERAMIC DISC 3300PF+-20% 16V
C2502	0893037	CERAMIC CHIP 3300PF+-10% 50V
C2503	0800352	ELECTROLYTIC 470UF 10V
C2504	0890043	CERAMIC DISC 0.01UF+-20% 16V
C2505	0800291	ELECTROLYTIC 10UF 16V
C2506	0800291	ELECTROLYTIC 10UF 16V
C2507	0800287	CAPASITOR 4.7UF+-20% 35V
C2508	0890038	CERAMIC DISC 3300PF+-20% 16V
C2509	0800287	CAPASITOR 4.7UF+-20% 35V
C2513	0800317	ELECTROLYTIC 47UF 16V
C2514	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2517	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2518	0800044	ELECTROLYTIC 47UF 50V
C2519	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2520	0800335	ELECTROLYTIC 220UF 16V
C2523	0800273	ELECTROLYTIC 0.22UF 50V
C2524	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2525	0800291	ELECTROLYTIC 10UF 16V
C2531	0800287	CAPASITOR 4.7UF+-20% 35V
C2532	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C2539	0890029	CERAMIC DISC 390PF+-10% 50V

SYMBOL-NO	P-NO	DESCRIPTION
C2901	0893031	CERAMIC CHIP 1000PF+-10% 50V
C2902	0800109	ELECTROLYTIC 1.0UF 50V
C2903	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2904	0800122	ELECTROLYTIC 10UF 16V
C2905	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2906	0800122	ELECTROLYTIC 10UF 16V
C2907	0800112	ELECTROLYTIC 2.2UF 50V
C2908	0890035	CERAMIC DISC 1000PF+-10% 50V
C2909	0209944	CERAMIC CHIP 150PF+-5% 50V
C2910	0209944	CERAMIC CHIP 150PF+-5% 50V
		RESISTORS
R0205	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R0206	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0207	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0208	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0212	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0213	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0215	0700039	CARBON FILM 8200HM+-5% 1/8W
R0216	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R0217	0700059	CARBON FILM 27KOHM+-5% 1/8W
R0218	0700027	CARBON FILM 100 OHM+-5% 1/8W
R0227	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0228	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0229	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R0238	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R0240	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R0241	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R0253	0103841	CHIP RESISTOR 680 OHM+-5% 0.1W
R0254	0700075	CARBON FILM 390KOHM+-5% 1/8W
R0257	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R0258	0700027	CARBON FILM 100 OHM+-5% 1/8W
R0263	0101391	CARBON FILM 2.2MOHM+-5% 1/8W
R0265	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0402	0700059	CARBON FILM 27KOHM+-5% 1/8W
R0403	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0404	0103838	RESISTOR CHIP 390OHM+-5% 0.1W
R0407	0103833	CHIP RESISTOR 150 OHM+-5% 0.1W
R0408	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R0409	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W
R0410	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0420	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0421	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0422	0103819	CHIP RESISTOR 10 OHM+-5% 0.1W
R0423	0700057	CARBON FILM 18KOHM+-5% 1/8W
R0424	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R0425	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R0426	0700063	CARBON FILM 47KOHM+-5% 1/8W
R0427	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R0429	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0430	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0431	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0432	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0434	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R0435	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R0436	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R0437	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R0501	0700054	CARBON FILM 10KOHM+-5% 1/8W
R0502	0700048	CARBON FILM 3.9KOHM+-5% 1/8W
R0503	0700063	CARBON FILM 47KOHM+-5% 1/8W
R0504	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0505	0700063	CARBON FILM 47KOHM+-5% 1/8W
R0506	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0509	0700049	CARBON FILM 4.7KOHM+-5% 1/8W

SYMBOL-NO	P-NO	DESCRIPTION
R0510	0104252	CHIP RESISTOR 510 OHM+-5% 1/10W
R0511	AQ10296R	CHIP RESISTOR 15KOHM+-0.1% 1/10W
R0512	AQ10295R	CHIP RESISTOR 11KOHM+-0.1% 1/10W
R0516	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0517	0104252	CHIP RESISTOR 510 OHM+-5% 1/10W
R0520	0700063	CARBON FILM 47KOHM+-5% 1/8W
R0521	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0522	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R0523	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0524	0700054	CARBON FILM 10KOHM+-5% 1/8W
R0525	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R0526	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
R0527	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
R0530	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R0531	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R0532	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0533	0103866	CHIP RESISTOR 82KOHM+-5% 0.1W
R0534	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0540	0700033	CARBON FILM 2700HM+-5% 1/8W
R0541	0700033	CARBON FILM 2700HM+-5% 1/8W
R0602	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0605	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R0615	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0621	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0622	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0623	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0624	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0625	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0626	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0627	0700036	CARBON FILM 470 OHM+-5% 1/8W
R0628	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
R0629	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R0630	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R0631	0103870	CHIP RESISTOR 180KOHM+-5% 0.1W
R0632	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0633	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R0634	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0635	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0636	0700037	CARBON FILM 5600HM+-5% 1/8W
R0637	0700044	CARBON FILM 1.8KOHM+-5% 1/8W
R0638	0700044	CARBON FILM 1.8KOHM+-5% 1/8W
R0710	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0711	0700063	CARBON FILM 47KOHM+-5% 1/8W
R0712	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
R0713	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R0714	0103827	CHIP RESISTOR 47 OHM+-5% 0.1W
⚠ R0851	AT10401G	RESISTOR 4.7MOHM+-10% 1/2W
R0852	AT10211M	CHIP RESISTOR 1MOHM 1/2W
R0853	0700074	CARBON FILM 330KOHM+-5% 1/8W
R0854	0700074	CARBON FILM 330KOHM+-5% 1/8W
R0855	0700074	CARBON FILM 330KOHM+-5% 1/8W
R0856	AT10244S	RESISTOR 0.470HM+-5% 1W
R0857	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0858	AT10242S	RESISTOR 120 OHM+-5% 2W
R0860	0116664	CHIP RESISTOR 68KOHM+-5% 2W
R0861	0116664	CHIP RESISTOR 68KOHM+-5% 2W
R0862	0700047	CARBON FILM 3.3KOHM+-5% 1/8W
R0863	0700054	CARBON FILM 10KOHM+-5% 1/8W
R0864	0700033	CARBON FILM 2700HM+-5% 1/8W
R0865	0700036	CARBON FILM 470 OHM+-5% 1/8W
R0866	0700034	CARBON FILM 3300HM+-5% 1/8W
R0867	0700038	CARBON FILM 6800HM+-5% 1/8W
R0868	0700055	CARBON FILM 12KOHM+-5% 1/8W
R0869	0104114	CHIP RESISTOR 3.3KOHM+-1% 0.1W
R0871	0105572	METAL FILM RESISTOR 2.7KOHM+-1% 1/10

SYMBOL-NO	P-NO	DESCRIPTION
R0872	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R0873	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R0874	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0875	0700032	CARBON FILM 220 OHM+-5% 1/8W
R0878	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0879	0700038	CARBON FILM 6800HM+-5% 1/8W
R0885	0700056	CARBON FILM 15KOHM+-5% 1/8W
R0886	0700056	CARBON FILM 15KOHM+-5% 1/8W
R0887	0700046	CARBON FILM 2.7KOHM+-5% 1/8W
R0889	0700062	CARBON FILM 39KOHM+-5% 1/8W
R0891	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0892	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0893	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0894	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0901	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0902	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0903	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0904	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
R0905	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0906	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0907	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0908	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0909	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R0910A	0700056	CARBON FILM 15KOHM+-5% 1/8W
R0911	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R0913	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0914	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0915	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0916	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0917	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0918	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0919	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0920	0700054	CARBON FILM 10KOHM+-5% 1/8W
R0921	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0922	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0923	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0924	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0925	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0926	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0927	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0928	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0929	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0934	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0935	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R0936	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0937	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0938	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
R0939	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0940	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
R0941	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0943	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0944	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0945	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0946	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0947	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0948	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0950	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0951	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0952	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0954	0700073	CARBON FILM 270KOHM+-5% 1/8W
R0955	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
R0956	0700036	CARBON FILM 470 OHM+-5% 1/8W
R0957	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R0963	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0967	0700041	CARBON FILM 1.0KOHM+-5% 1/8W

SYMBOL-NO	P-NO	DESCRIPTION
R0969	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W
R0970	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W
R0971	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0972	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0976	0101725	CHIP RESISTOR 2.2 OHM+-5% 1/4W
R0977	0700067	CARBON FILM 100KOHM+-5% 1/8W
R0978	0101765	RESISTOR 10KOHM+-1% 1/8W
R0979	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R0980	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0981	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0983	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0984	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0988	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R0990	0700067	CARBON FILM 100KOHM+-5% 1/8W
R0991	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W
R0992	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W
R0993	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0994	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0995	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R0996	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R0997	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R0998	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R0999	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1101	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R1103	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1104	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R1107	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
R1108	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
R1109	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R1110	0103842	CHIP RESISTOR 820 OHM+-5% 0.1W
R1112	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1113	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1115	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W
R1116	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R1117	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1118	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R1120	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R1121	0700032	CARBON FILM 220 OHM+-5% 1/8W
R1403	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R1405	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1406	0700024	CARBON FILM 56 OHM+-5% 1/8W
R1407	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R1409	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1410	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R1412	0700076	CARBON FILM 470KOHM+-5% 1/8W
R1413	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R1416	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R1418	0700027	CARBON FILM 100 OHM+-5% 1/8W
R1421	0700027	CARBON FILM 100 OHM+-5% 1/8W
R1422	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1423	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R1424	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R1430	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R1432	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R1433	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R1434	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R1437	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R1438	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1701	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1702	0700063	CARBON FILM 47KOHM+-5% 1/8W
R1703	0700036	CARBON FILM 470 OHM+-5% 1/8W
R1704	0700036	CARBON FILM 470 OHM+-5% 1/8W
R1708	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R1711	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R1712	0700049	CARBON FILM 4.7KOHM+-5% 1/8W

SYMBOL-NO	P-NO	DESCRIPTION
R1713	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R1714	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R1802	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R1806	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1807	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1808	0700053	CARBON FILM 8.2KOHM+-5% 1/8W
R1809	0700057	CARBON FILM 18KOHM+-5% 1/8W
R1818	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1820	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1822	0700054	CARBON FILM 10KOHM+-5% 1/8W
R2101	0700059	CARBON FILM 27KOHM+-5% 1/8W
R2102	0700067	CARBON FILM 100KOHM+-5% 1/8W
R2103	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R2104	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R2105	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R2106	0103893	CHIP RESISTOR 75 OHM+-5% 1/8W
R2107	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R2108	0700048	CARBON FILM 3.9KOHM+-5% 1/8W
R2109	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R2110	0700048	CARBON FILM 3.9KOHM+-5% 1/8W
R2111	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R2112	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R2113	0103893	CHIP RESISTOR 75 OHM+-5% 1/8W
R2114	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R2115	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R2116	0700054	CARBON FILM 10KOHM+-5% 1/8W
R2117	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R2501	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R2502	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R2503	0101400	CARBON FILM 75OHM+-5% 1/8W
R2504	0700023	CARBON FILM 47OHM+-5% 1/8W
R2507	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R2508	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R2509	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R2510	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R2511	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R2512	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R2514	0101835	CARBON FILM 1.5KOHM+-5% 1/4W
R2515	0103870	CHIP RESISTOR 180KOHM+-5% 0.1W
R2517	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W
R2518	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R2523	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R2524	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R2527	0700063	CARBON FILM 47KOHM+-5% 1/8W
R2530	0700023	CARBON FILM 47OHM+-5% 1/8W
R2533	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
R2534	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
R2535	0103839	CHIP RESISTOR 4700HM+-5% 0.1W
R2536	0700019	CARBON FILM 27 OHM+-5% 1/8W
R2537	0700019	CARBON FILM 27 OHM+-5% 1/8W
R2538	0700025	CARBON FILM 68OHM+-5% 1/8W
R2539	0103834	CHIP RESISTOR 1800HM+-5% 0.1W
R2540	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R2541	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W
R2542	0700054	CARBON FILM 10KOHM+-5% 1/8W
R2701	0700057	CARBON FILM 18KOHM+-5% 1/8W
R2702	0700054	CARBON FILM 10KOHM+-5% 1/8W
R2703	0700057	CARBON FILM 18KOHM+-5% 1/8W
R2704	0700054	CARBON FILM 10KOHM+-5% 1/8W
R2705	0700048	CARBON FILM 3.9KOHM+-5% 1/8W
R2706	0700029	CARBON FILM 150 OHM+-5% 1/8W
R2707	0700046	CARBON FILM 2.7KOHM+-5% 1/8W
R2708	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R2709	0700047	CARBON FILM 3.3KOHM+-5% 1/8W
R2901	0700041	CARBON FILM 1.0KOHM+-5% 1/8W

SYMBOL-NO	P-NO	DESCRIPTION
R2902	0700032	CARBON FILM 220 OHM+-5% 1/8W
R2903	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R2904	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R2905	0700081	CARBON FILM 1.0MOHM+-5% 1/8W
R2906	0700047	CARBON FILM 3.3KOHM+-5% 1/8W
R2907	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W
R2908	0700027	CARBON FILM 100 OHM+-5% 1/8W
R2909	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
RT1801	AW10188R	SEMI VARIABLE 22KOHM
		SEMI-CONDUCTORS
D0603	5339231	DIODE 1SR35-100A
D0604	5339231	DIODE 1SR35-100A
D0851	5336552	DIODE S1WBA60
D0852	CH10191M	DIODE EG01C-T
D0853	CH10481M	DIODE AG01Z
D0856	CH10481M	DIODE AG01Z
D0857	CH10462S	DIODE S3L20U
D0858	CH10641S	DIODE D3S6M
D0860	5339551	DIODE SS1J4
D0861	5339551	DIODE SS1J4
D0864	CH10191M	DIODE EG01C-T
D0901	5339551	DIODE SS1J4
D0906	5339071	DIODE 1SS119
D0907	5339071	DIODE 1SS119
D0908	5339231	DIODE 1SR35-100A
D0909	5339231	DIODE 1SR35-100A
D1101	5339071	DIODE 1SS119
D1102	5328307	DIODE MA151WK
D1403	5339071	DIODE 1SS119
D1701	5339071	DIODE 1SS119
D2501	5339071	DIODE 1SS119
D2502	5339071	DIODE 1SS119
D2504	5339071	DIODE 1SS119
IC0201	CK14412U	IC HA118203NF
IC0202	CK13571R	IC MSM7470-72MS-KR1
IC0501	CK14421	IC AN3964FB
IC0851	1360452	IC TL431CLP
IC0901	CK14993	IC HD6433977SA70F
IC0902	CP10312R	IC PST9129
IC0903	CP10915	IC ST24C02FB6
IC0904	CP10291	IC BA6209
IC0905	CP11361R	IC M5278L05
IC1101	CK14481	IC HA118198FP
IC1102	CP11191	IC LA7256
IC1701	CZ10181	IC BU9716K
IC1801	CS10352	MODULE HTS7337A
IC2101	CJ10212	PHOTO INTERLAPTER SG-236
IC2102	CJ10222	PHOTO INTERLAPTER SG-237
IC2501	CK13501R	IC NJM2533M
IC2901	CP11001	IC LC7455A
LD1701	CH10781R	DIODE SLP3117E
LD1702	CH10781R	DIODE SLP3117E
LD1703	CH10781R	DIODE SLP3117E
LD1704	CH10781R	DIODE SLP3117E
LD2101	CH10542	DIODE GL451L1
LD2701	CH10791	DIODE SLP932C-20
Q0226	5328972	TRANSISTOR 2SC2412K-BRT
Q0228	5328793	TRANSISTOR DTC144EK
Q0406	5323172	TRANSISTOR 2SC1214CD
Q0409	5327001	TRANSISTOR 2SC458CD
Q0410	5328793	TRANSISTOR DTC144EK
Q0411	5327021	TRANSISTOR 2SA844CD
Q0412	5328972	TRANSISTOR 2SC2412K-BRT

SYMBOL-NO	P-NO	DESCRIPTION
Q0413	5328972	TRANSISTOR 2SC2412K-BRT
Q0701	1323081	TRANSISTOR 2SA1036K
Q0702	5328972	TRANSISTOR 2SC2412K-BRT
Q0851	CF10622	TRANSISTOR FS3KM-10T0-220
Q0852	CF10451R	TRANSISTOR 2SC3246
Q0853	1321341	TRANSISTOR 2SD1765
Q0854	5327262	TRANSISTOR 2SB1326
Q0855	5328972	TRANSISTOR 2SC2412K-BRT
Q0858	5327131	TRANSISTOR 2SB562C
Q0859	5327063	TRANSISTOR 2SC1740S
Q0864	1321341	TRANSISTOR 2SD1765
Q0901	5327151	TRANSISTOR 2SA952-ML2
Q0902	5328793	TRANSISTOR DTC144EK
Q0905	5328962	TRANSISTOR 2SA1037K
Q0906	5328962	TRANSISTOR 2SA1037K
Q0911	5328962	TRANSISTOR 2SA1037K
Q0912	5328793	TRANSISTOR DTC144EK
Q0913	5328972	TRANSISTOR 2SC2412K-BRT
Q0914	5328793	TRANSISTOR DTC144EK
Q1101	5328972	TRANSISTOR 2SC2412K-BRT
Q1102	5328962	TRANSISTOR 2SA1037K
Q1401	5328972	TRANSISTOR 2SC2412K-BRT
Q1404	5328962	TRANSISTOR 2SA1037K
Q1407	5328962	TRANSISTOR 2SA1037K
Q1409	5328972	TRANSISTOR 2SC2412K-BRT
Q1410	5328962	TRANSISTOR 2SA1037K
Q1411	5328972	TRANSISTOR 2SC2412K-BRT
Q1701	5327071	TRANSISTOR DTC124ES
Q1702	5327071	TRANSISTOR DTC124ES
Q1802	5328793	TRANSISTOR DTC144EK
Q2101	CF10372	TRANSISTOR PT493FL1
Q2102	CF10372	TRANSISTOR PT493FL1
Q2103	5328793	TRANSISTOR DTC144EK
Q2104	5328793	TRANSISTOR DTC144EK
Q2501	5328972	TRANSISTOR 2SC2412K-BRT
Q2502	5328972	TRANSISTOR 2SC2412K-BRT
Q2503	5328972	TRANSISTOR 2SC2412K-BRT
Q2504	5328793	TRANSISTOR DTC144EK
Q2505	5328972	TRANSISTOR 2SC2412K-BRT
Q2506	5328793	TRANSISTOR DTC144EK
Q2509	5327074	TRANSISTOR DTA144ES-T
Q2901	5328972	TRANSISTOR 2SC2412K-BRT
⚠PC0851	1322421	PHOTOCOUPLER PC817A
⚠QF0851	5721945	IC PROTECTOR, ICP-N38
⚠QF0852	5721946	PROTECTOR, ICP-N15
ZD0851	5339251	DIODE HZS2-C3
ZD0861	5336811	DIODE MA2180A
ZD0862	5339268	DIODE HZS11B2
ZD0864	5339482	DIODE HZS15-2
ZD0901	5339275	DIODE HZS7-B2
ZD0903	5339297	DIODE HZS5C3
ZD0904	5339297	DIODE HZS5C3
ZD2501	5339288	DIODE HZS30-3
ZD2502	5339296	DIODE HZS5B2
		TRANSFORMERS
T0401	BT10251	TRANSFORMER, POWER
⚠T0851	5216914	TRANSFORMER, POWER
		COILS
L0202	0770057	CHOKE COIL 100UH+-5%
L0203	5121288	COIL 15UH
L0204	5121287	COIL 10UH

SYMBOL-NO	P-NO	DESCRIPTION
L0205	0770057	CHOKE COIL 100UH+-5%
L0206	5121569	COIL 82UH
L0208	0770057	CHOKE COIL 100UH+-5%
L0209	5159142	CHOKE COIL 12UH
L0210	5159146	CHOKE COIL 27UH
L0401	5159114	COIL 15MH
L0403	0770057	CHOKE COIL 100UH+-5%
L0501	0770048	CHOKE COIL 22UH+-5%
L0502	0770057	CHOKE COIL 100UH+-5%
⚠L0851	BV10241	FILTER, LINE
L0853	BH00201R	COIL 10UH
L0854	BH00205R	COIL 22UH
L1101	0770057	CHOKE COIL 100UH+-5%
L1102	0770057	CHOKE COIL 100UH+-5%
L1103	0770057	CHOKE COIL 100UH+-5%
L1105	5121296	COIL 220UH
L1106	5121296	COIL 220UH
L1402	5121288	COIL 15UH
L1403	5121284	COIL 3.3UH
L1406	0770057	CHOKE COIL 100UH+-5%
L1701	0770057	CHOKE COIL 100UH+-5%
L1801	0770057	CHOKE COIL 100UH+-5%
L2502	0770061	CHOKE COIL 180 UH
L2504	0770057	CHOKE COIL 100UH+-5%
L2902	5121294	COIL 100UH
L2903	5121294	COIL 100UH
		CRYSTALS
X0201	BP10531	CRYSTAL
X0901	BP10571	CRYSTAL
X0902	BP10251	CRYSTAL
X2901	BP10461	CRYSTAL
		MISCELLANEOUS
BL0851	5272378	LC FILTER
BL0853	5272378	LC FILTER
BL0901	5272379	COIL
BL0902	5274521	CORE, FERRITE
⚠F0851	FN10201	FUSE 003A
FE2501	5582216	TUNER IF UNIT
⚠FH0851	5722412	HOLDER, FUSE
⚠FH0852	5722412	HOLDER, FUSE
IR1701	CW10173	MODULE TENS5380B
JK2501	ES10343	JACK
JK2503	ES10373	JACK (HEPM)
LCD1701	DB10341	FLOURESENT DISPLAY
LMP1701	5763357	LAMP
LMP1702	5763357	LAMP
LMP1703	5763357	LAMP
S0708	5636101	SWITCH
S1701	5634884	SWITCH
S2101	FD10211	SWITCH, MODE
S2102	5635631	SWITCH
S2103	5635631	SWITCH
S2701	FH10271	SWITCH
S2702	5634884	SWITCH
S2703	5634884	SWITCH
S2704	5634884	SWITCH
S2705	5634884	SWITCH
S2706	5634884	SWITCH

Applied Models: VT-FX624A

Cautions when using schematic diagrams

Caution for safety
The parts marked ⚠ are critical for safety. Be sure to use the specified parts to ensure safety when replacing them.

1. Values in schematic diagrams
The values, dielectric strength (power capacitance) and tolerances of the resistors (excluding variable resistors) and capacitors are indicated in the schematic diagrams using abbreviations.

[Resistors]

Item	Indication
Value	No indication ····· Ω K ····· kΩ M ····· MΩ
Tolerance	No indication ····· ±5% (All tolerances other than ±5% are indicated in the schematic diagrams)
Power capacitance	No indication ····· 1/8W (1/16W for leadless resistors without indication) All capacitances other than the above are indicated in the schematic diagrams.

[Capacitors]

Item	Indication
Value	No indication ····· μF P ····· pF
Dielectric strengh	No indication ····· 50V (All dielectric strengths other than 50V are indicated in the schematic diagrams.)

[Coils]

Item	Indication
Value	μ ····· μH m ····· mH

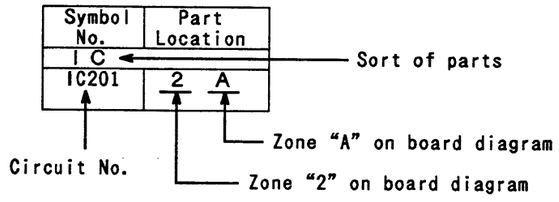
2. Markings in schematic diagrams
(1) Parts marked "■" with circuit numbers in the schematic diagrams are discrete parts.
(2) Parts marked "●" with circuit numbers in the schematic diagrams are leadless parts.

Cautions when using circuit board diagrams

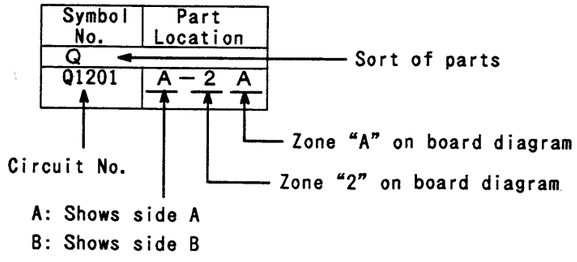
1. Identifications of sides A/B in circuit board diagrams
(1) Board having a pattern on one side and parts on both sides.
Side A: Shows discrete parts, viewed from the pattern side.
Side B: Shows leadless parts, viewed from the pattern side.
(2) Board having patterns on both sides and parts on both sides.
Side A: Shows parts and patterns which can be seen when the case is opened.
Side B: Shows parts and the pattern on the back of side A.

2. Table for indexing locations of parts
This table shows locations of each part on the circuit board diagrams. The locations are indicated using the guide scales on the external lines of diagrams.

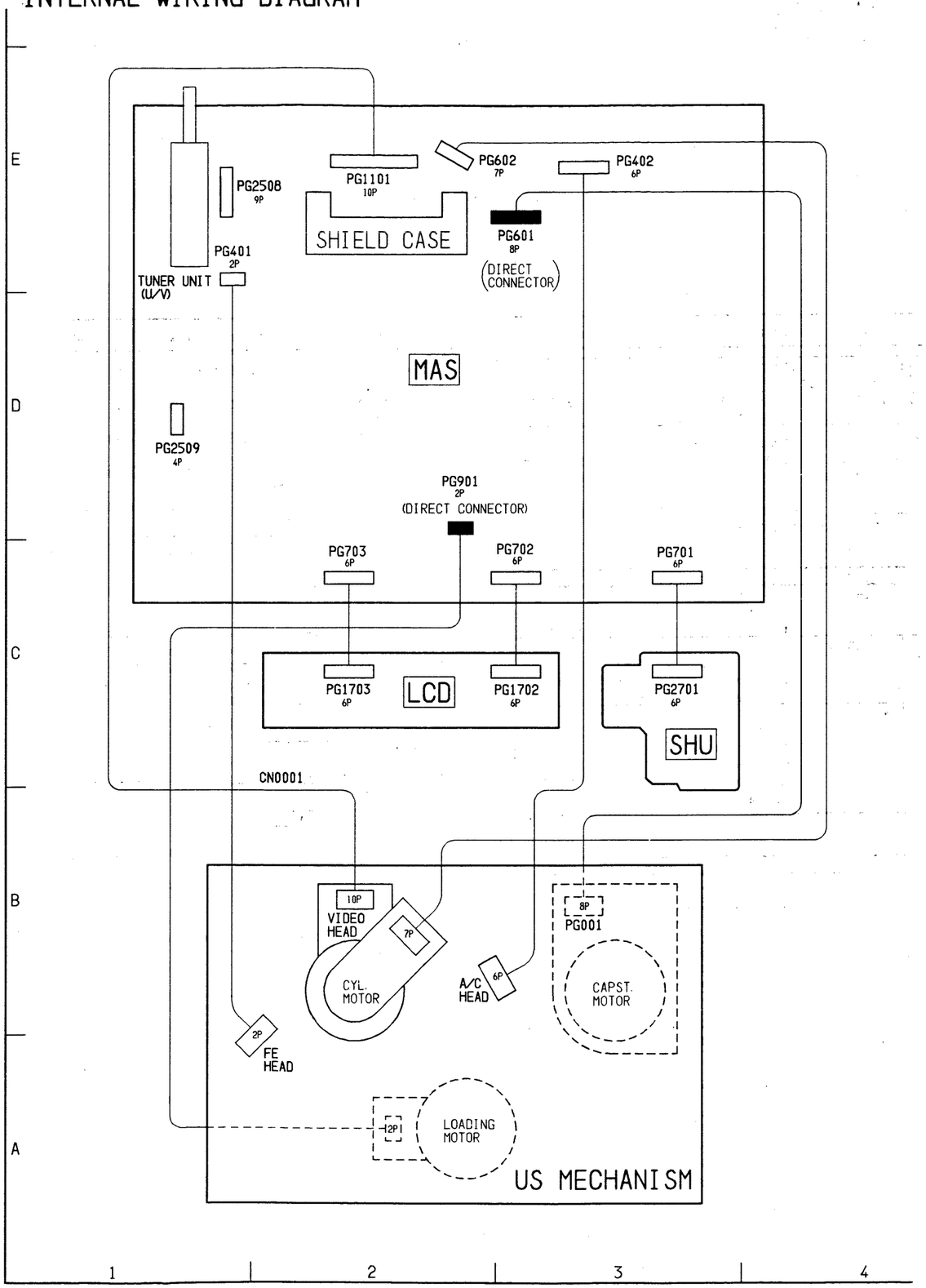
(1) In case of one-layer board



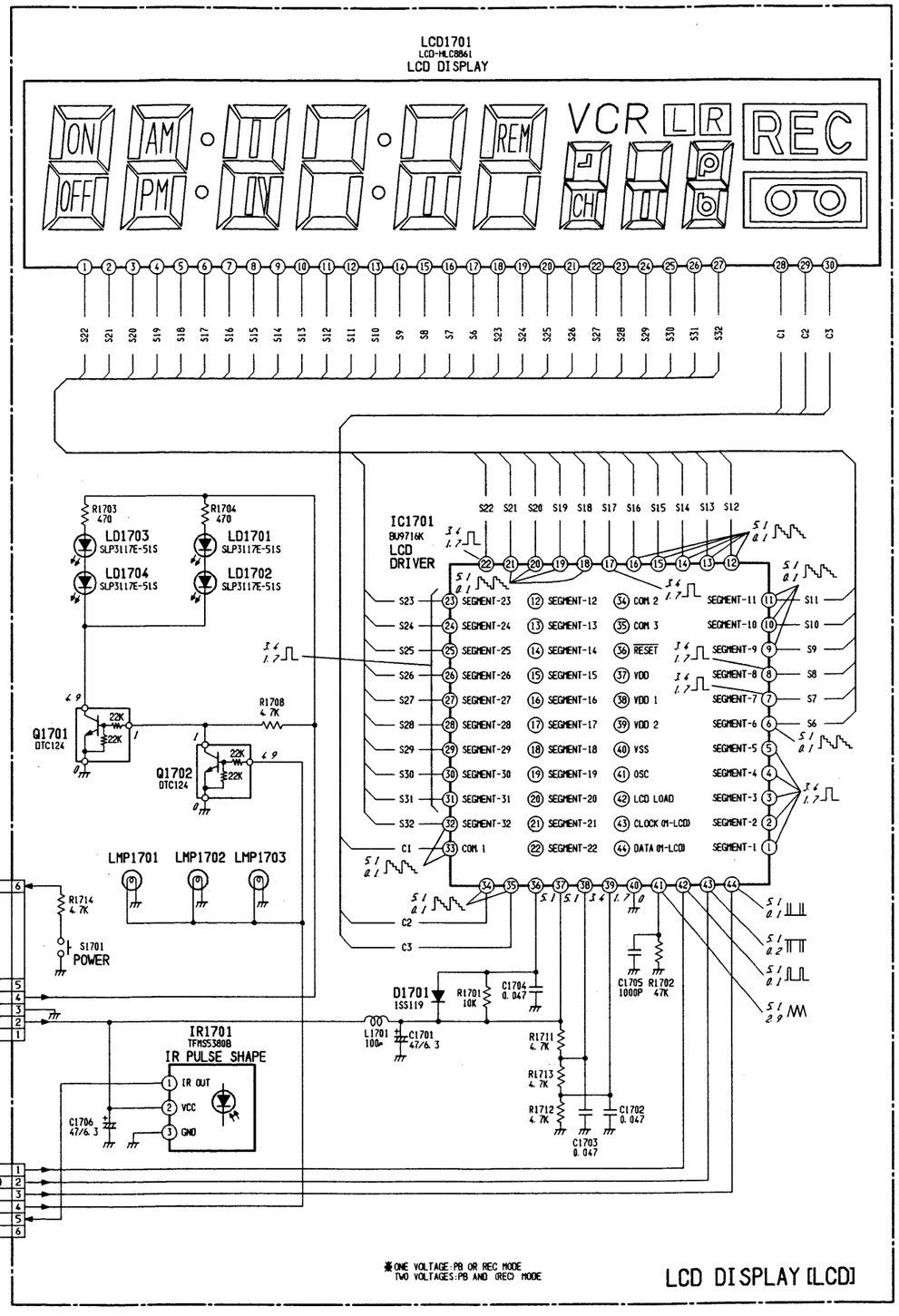
(2) In case of side A/B indication board



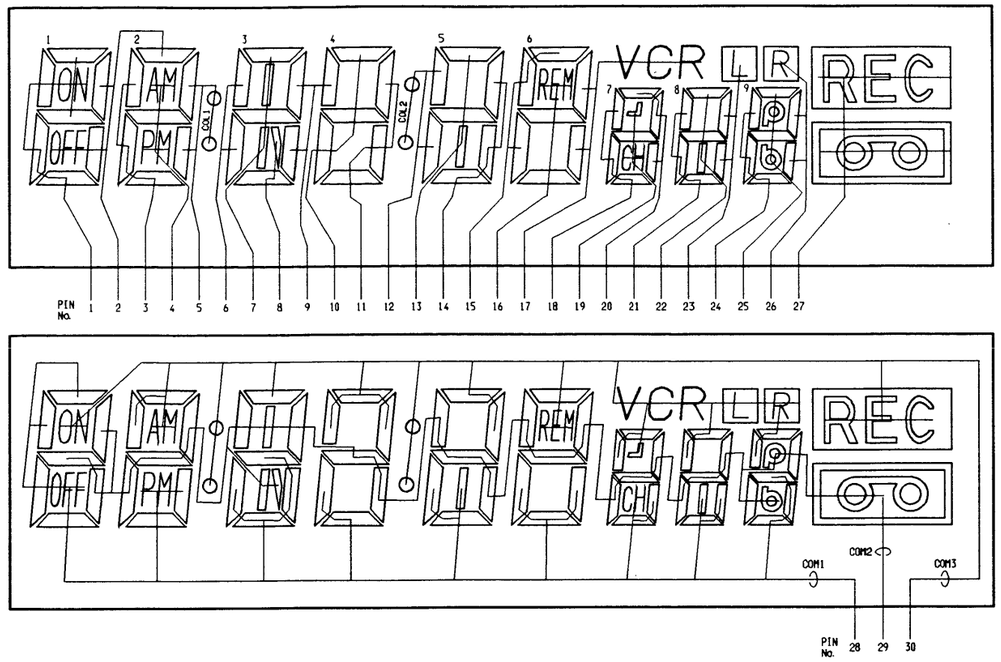
INTERNAL WIRING DIAGRAM



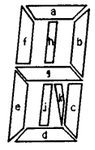
LCD DISPLAY [LCD] SCHEMATIC DIAGRAM



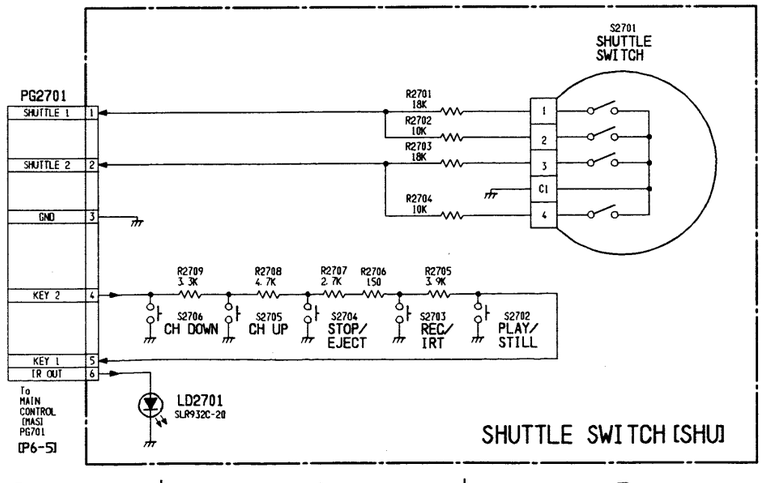
LCD GRID TABLE



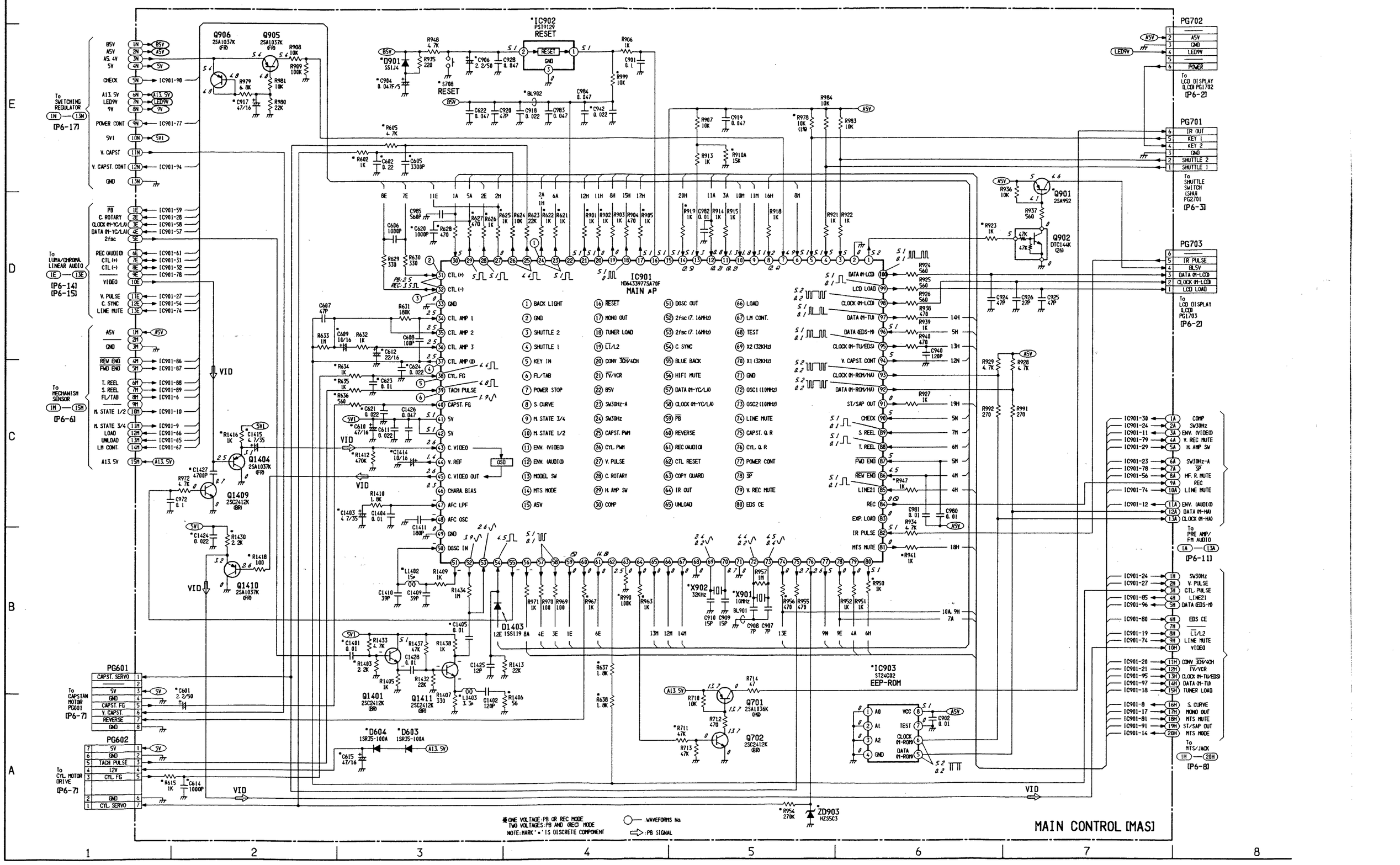
PIN No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
COM1	ladef	OFF	2d	PM	2c	3e	3g	3d	3c	4e	4d	5e	5j	5d	6e	6d	6c	7d	CH	7c	8d	8j	8c	9d	9g	9c	—	COM	—	—
COM2	1g	1bc	2e	2g	2b	3f	3hj	3k	3b	4g	4c	5f	5g	5c	6f	6g	6b	7e	7g	7b	8e	8g	8b	9e	9a	9b	—	COM	—	
COM3	ON	2a	2f	AM	COL1	—	3a	—	4f	4a	4b	COL2	5a	5b	6a	REM	VCR	7f	⊿	7a	8f	8a	L	9f	9a	R	REC	—	—	COM



SHUTTLE SWITCH [SHU] SCHEMATIC DIAGRAM



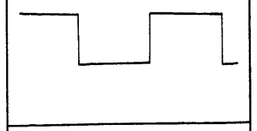
MAIN CONTROL [MAS] SCHEMATIC DIAGRAM



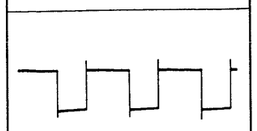
MAIN CONTROL 6-4 6-5 MAIN CONTROL

SERVO WAVEFORMS

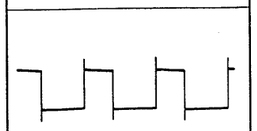
1-A IC901-24 5.6Vp-p
2V/5.0msec. cm
REC/PLAY



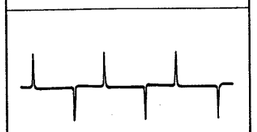
2-A IC901-31 5.7Vp-p
2V/10.0msec. cm
REC



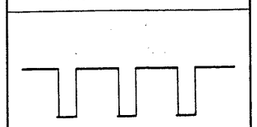
3-A IC901-32 5.7Vp-p
2V/10.0msec. cm
REC



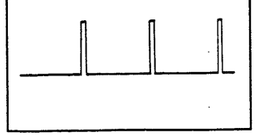
4-B IC901-37 3.2Vp-p
1V/10.0msec. cm
PLAY



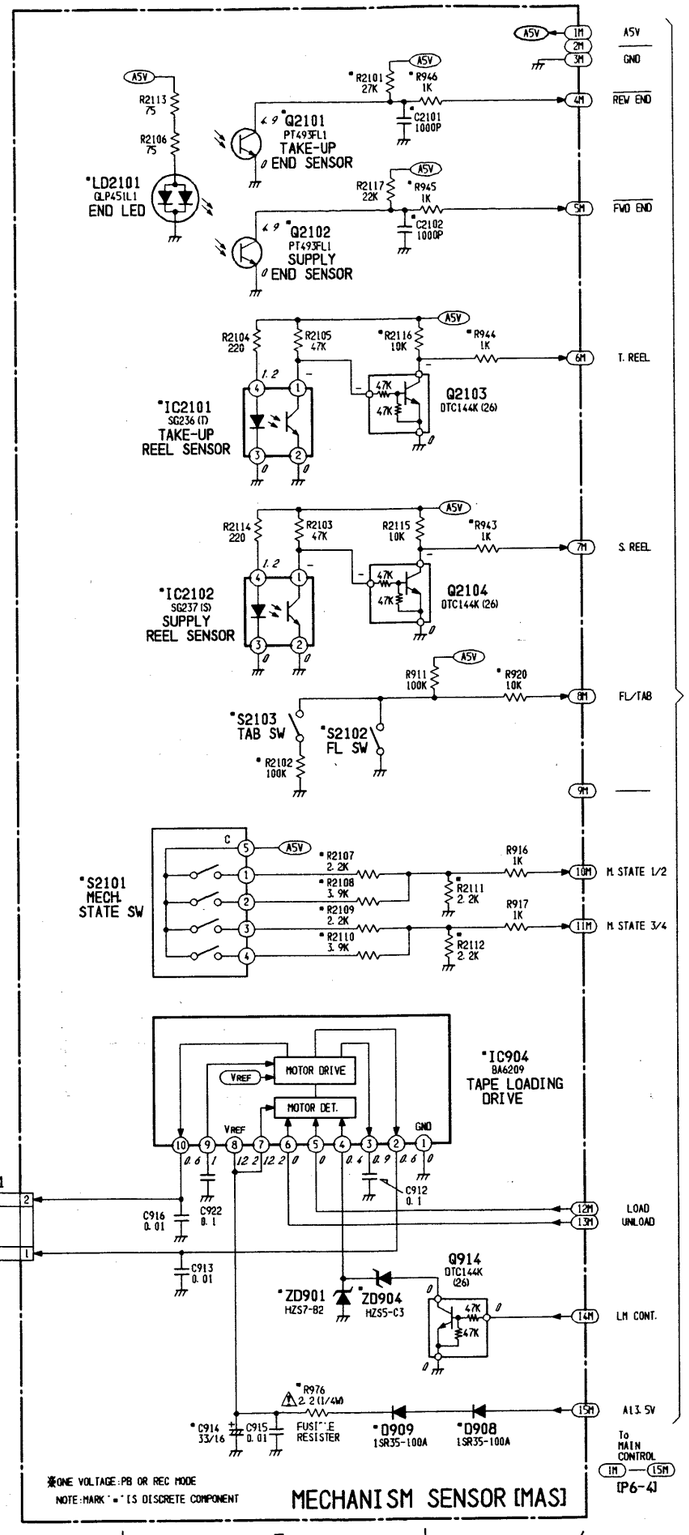
5-A IC901-38 4.6Vp-p
2V/500 μ sec. cm
REC/PLAY



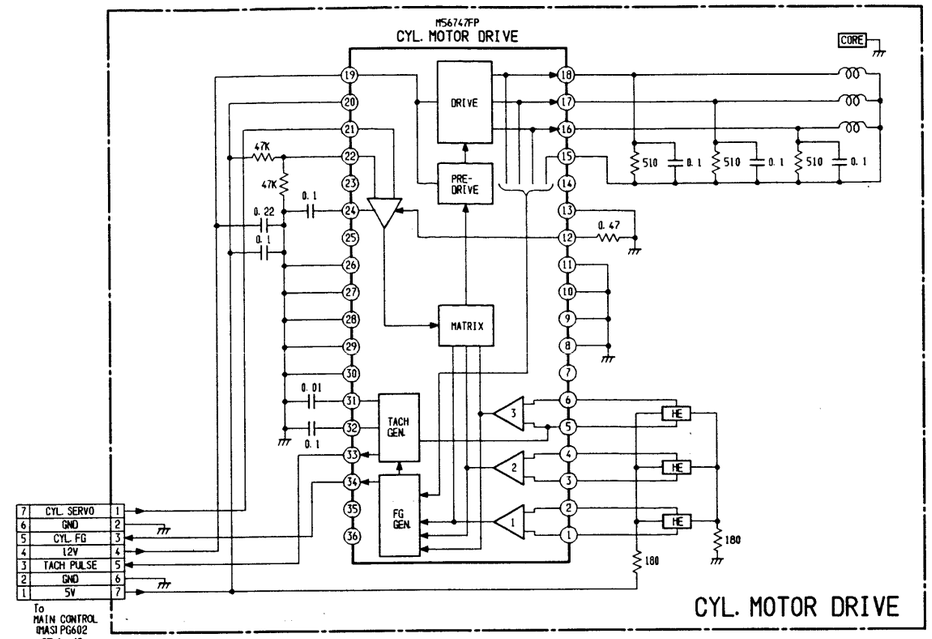
6-A IC901-39 4.8Vp-p
2V/10.0msec. cm
REC/PLAY



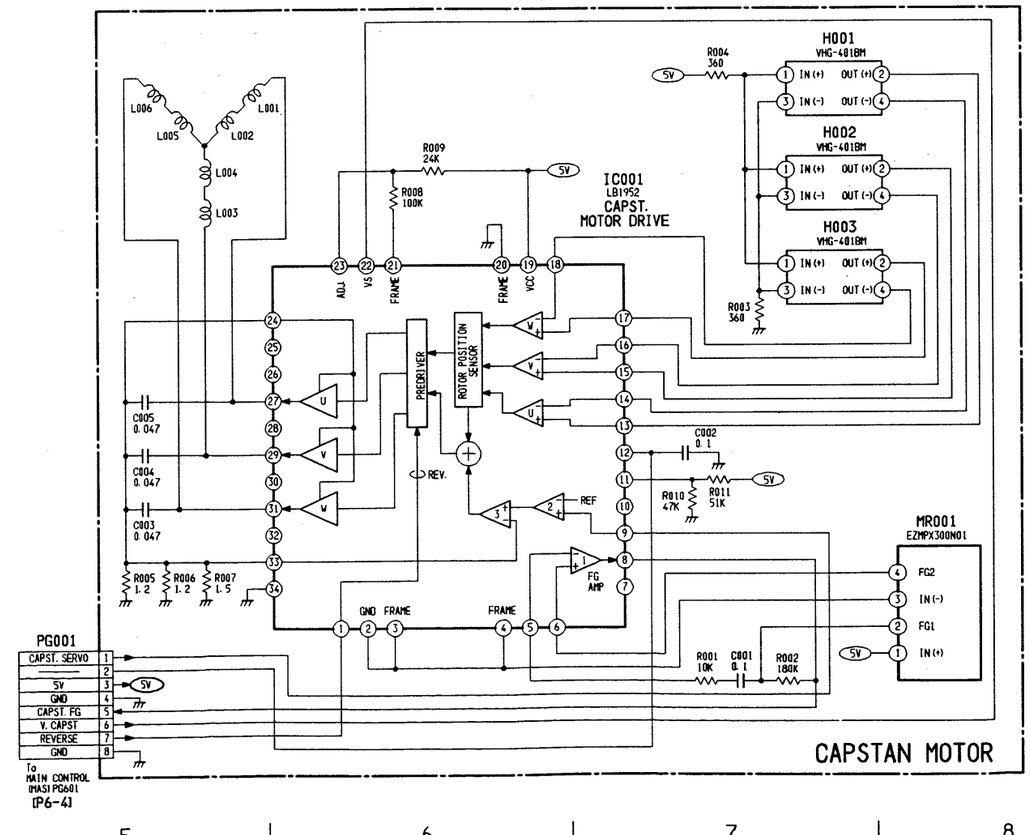
MECHANISM SENSOR [MAS] SCHEMATIC DIAGRAM



CYL. MOTOR DRIVE SCHEMATIC DIAGRAM



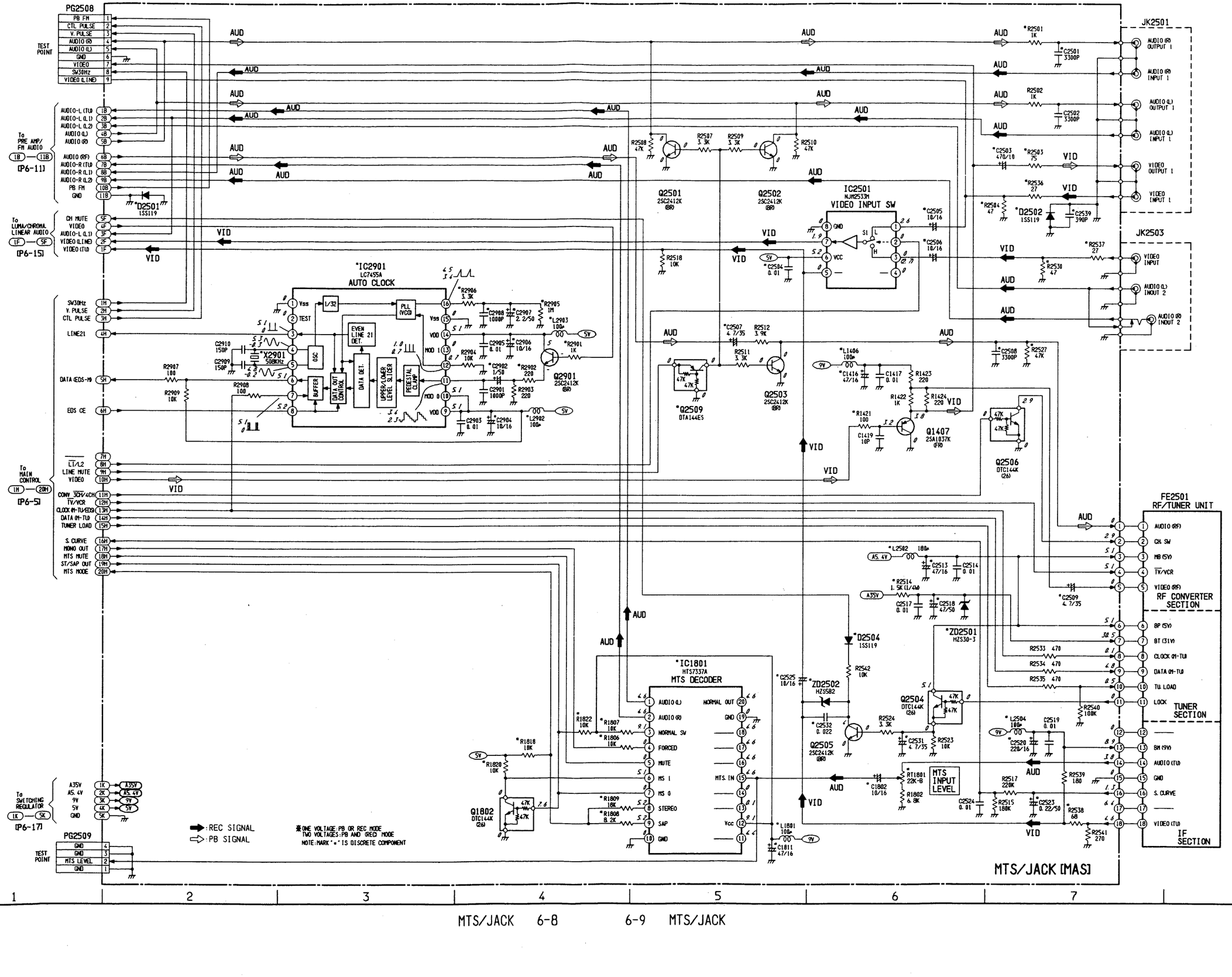
CAPSTAN MOTOR SCHEMATIC DIAGRAM



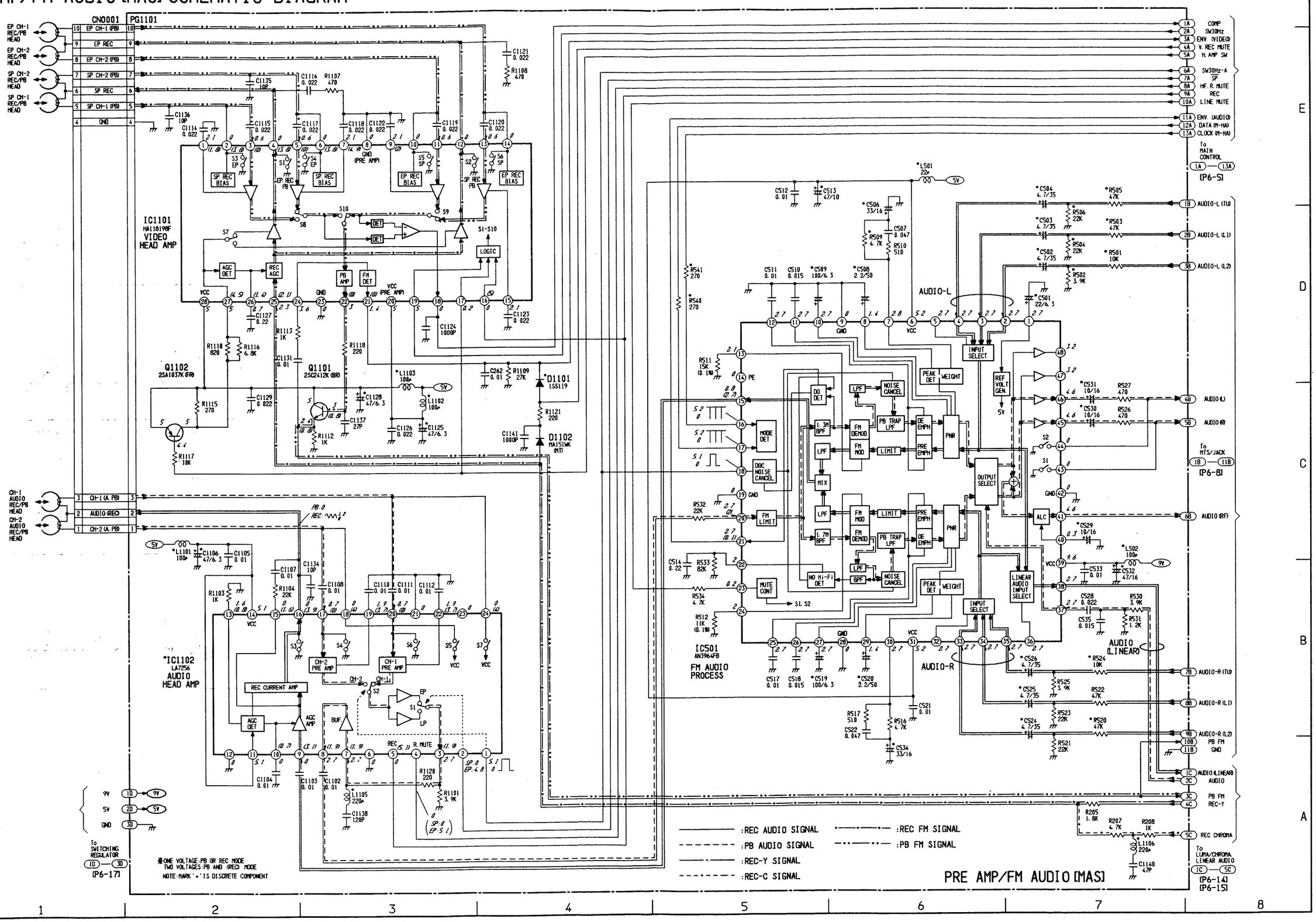
1 2 3 4 5 6 7 8

SERVO WAVEFORMS, MECHANISM SENSOR 6-6 6-7 CYL. MOTOR DRIVE, CAPSTAN MOTOR

MTS/JACK [MAS] SCHEMATIC DIAGRAM

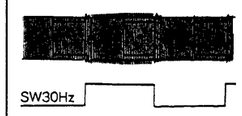
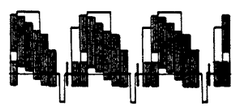
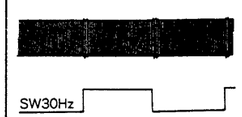
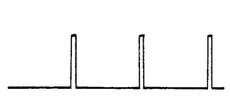
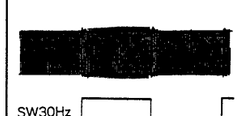
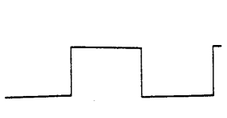
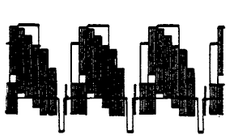
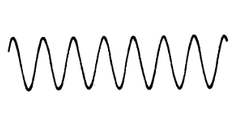
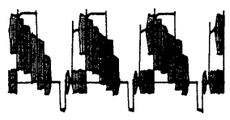


PRE AMP/FM AUDIO [MAS] SCHEMATIC DIAGRAM

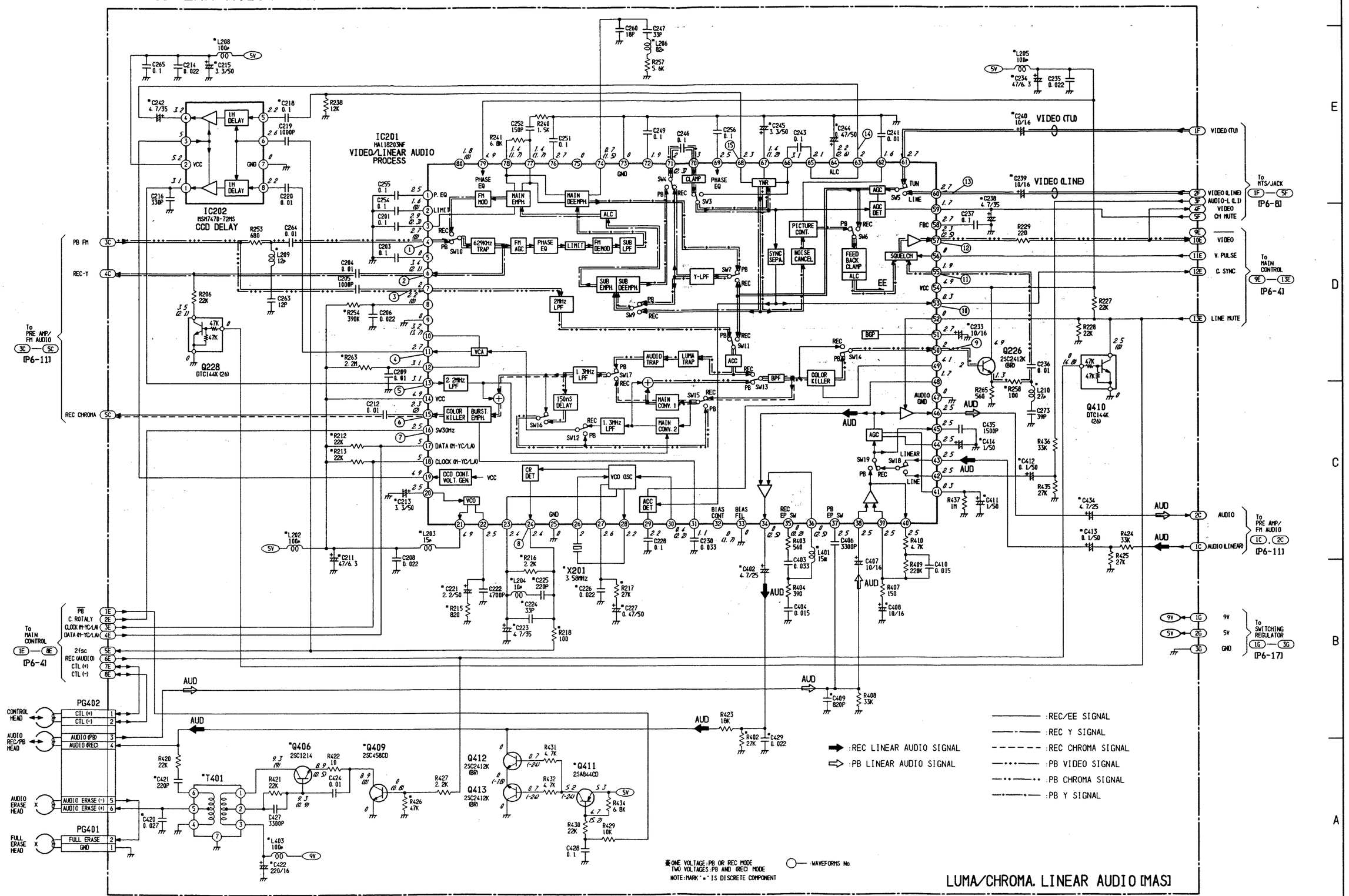


MEMO

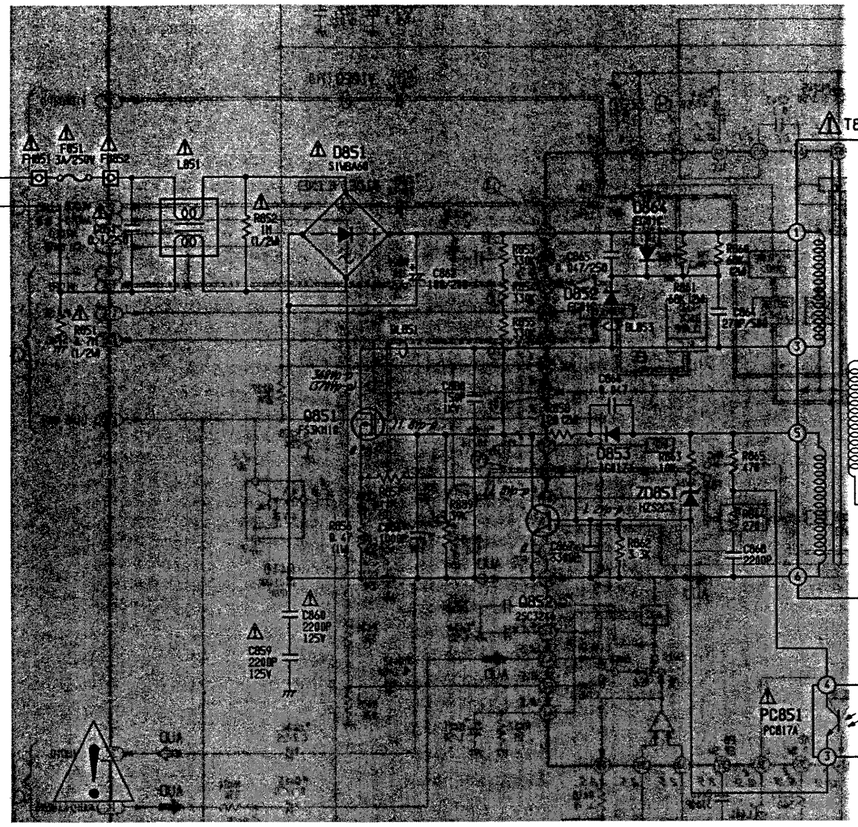
LUMINANCE/CHROMA WAVEFORMS

1-B IC201-4 550mVp-p 0.2V/5.0msec. cm PLAY	5-A IC201-13 530mVp-p 0.2V/20.0 μ sec. cm REC	9-B IC201-50 540mVp-p 0.2V/20.0 μ sec. cm PLAY	13-A IC201-60 1.4Vp-p 0.5V/20.0 μ sec. cm REC
			
2-A IC201-6 380mVp-p 0.2V/5.0msec. cm REC	5-B IC201-13 640mVp-p 0.2V/20.0 μ sec. cm PLAY	10-A IC201-53 5.0Vp-p 2V/20.0 μ sec. cm REC/PLAY	14-A IC201-63 680mVp-p 0.2V/20.0 μ sec. cm REC
			
3-B IC201-7 650mVp-p 0.2V/5.0msec. cm PLAY	6-A IC201-15 400mVp-p 0.1V/20.0 μ sec. cm REC	11-B IC201-55 500mVp-p 0.1V/20.0 μ sec. cm PLAY	14-B IC201-63 680mVp-p 0.2V/20.0 μ sec. cm PLAY
			
4-A IC201-11 330mVp-p 0.1V/20.0 μ sec. cm REC	7-A IC201-16 5.7Vp-p 2V/5.0msec. cm REC/PLAY	12-A IC201-57 2.1Vp-p 0.5V/20.0 μ sec. cm REC	15-A IC201-68 430mVp-p 0.2V/20.0 μ sec. cm REC
			
4-B IC201-11 420mVp-p 0.1V/20.0 μ sec. cm PLAY	8-A IC201-24 510mVp-p 0.2V/100nsec. cm REC/PLAY	12-B IC201-57 2.2Vp-p 0.5V/20.0 μ sec. cm PLAY	15-B IC201-68 430mVp-p 0.2V/20.0 μ sec. cm PLAY
			

LUMINANCE/CHROMA. LINEAR AUDIO [MAS] SCHEMATIC DIAGRAM



SWITCHING REGULATOR [MAS] SCHEMATIC DIAGRAM



AC120V 60Hz

FUSE1 3A/250V FUSE2 L851 D851 S1VB60 R852 1M 1/2W C853 0.047/250 D852 EGP10G R851 1M 1/2W C854 0.047/250 BU851 C855 0.047/250 C856 3300P/2KV Q851 2SK1118 D853 1SS133 R853 470 C857 2200P/2KV ZD851 HZS20L2 C858 2200P/2KV C859 2200P 125V C860 2200P/2KV Q852 2SC2412K (QR) R854 1.5K R855 0.47 (1W) C861 2200P/2KV C862 2200P 125V R856 1.5K C863 2200P/2KV C864 2200P/2KV C865 2200P/2KV C866 2200P/2KV C867 2200P/2KV C868 2200P 125V C869 2200P 125V

T851

D858 D3S6M L854 22μ C873 3300/10 QF851 ICP-N38 1.5A CIRCUIT PROTECTOR C874 470/25

D857 S3L20U ZD861 MA2180A L853 10μ C871 1000/25 C872 470/25

D856 AG01Z C885 4700P/500 C870 22/50

R866 330 R867 680 R869 3.3K (1W) C875 0.01 R868 12K

PC851 PC817A

IC851 TL431CLP VARIABLE CURRENT R871 2.7K (1W)

D860 SS1J4

D861 SS1J4

Q854 2SB1326 R874 22K R875 220

Q855 2SC2412K (QR) C882 100/6.3 R892 22K R891 22K

QF852 ICP-N15 600mA CIRCUIT PROTECTOR

Q853 2SD1765 R872 2.2K R873 2.2K C876 33/16 ZD862 HZS11B2 R878 22K

Q858 2SB562 R879 680

Q859 2SC1740S R893 22K R894 22K

D907 1SS119 R977 100K

D906 1SS119

C927 330P

IC905 M5278L05 5V REG C923 0.022

Q864 2SD1765 R885 15K R886 15K C878 0.022 ZD864 HZS15-2 R887 2.7K R888 8.2K R998 8.2K

Q913 2SC2412K (QR) R997 47K

Q911 2SA1037K (FR) R994 4.7K R993 4.7K R996 2.2K R995 5.6K

Q912 DTC144K (26) 47K 47K

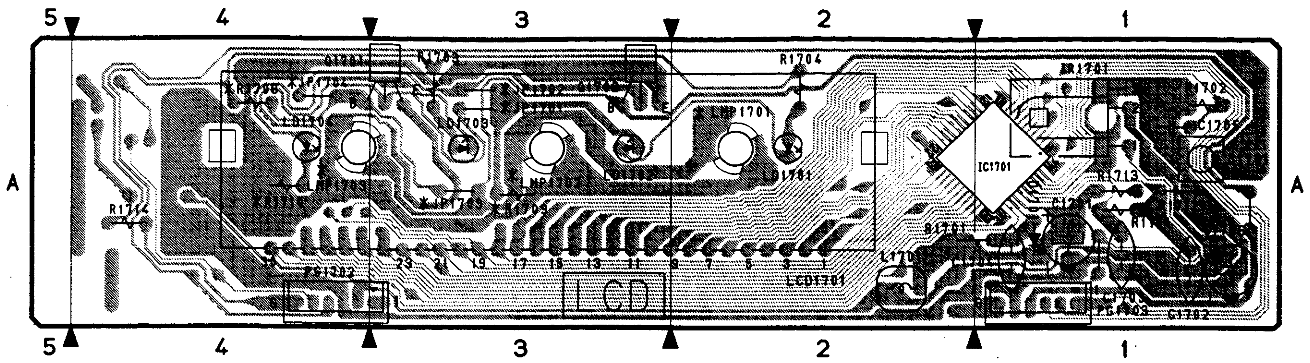
1N B5V
2N A5V
3N A5.4V
4N 5V
5N CHECK
6N A13.5V → To MAIN CONT 1N — 13N [P6-4]
7N LED9V
8N 9V
9N POWER CONT
10N 5V1
11N V. CAPST
12N V. CAPST. CONT
13N GND
1D 9V
2D 5V
3D GND → To PRE AMP/FM AUDIO 1D — 3D [P6-10]
1K A35V
2K A5.4V
3K 9V
4K 5V
5K GND → To MTS/JACK 1K — 5K [P6-8]
1G 9V
2G 5V
3G GND → To LUMA/CHROMA LINEAR AUDIO 1G — 3G [P6-15]

FOR ALL DEVICES COVERED WITH THIS SIGN:CAUTION "HIGH VOLTAGE"

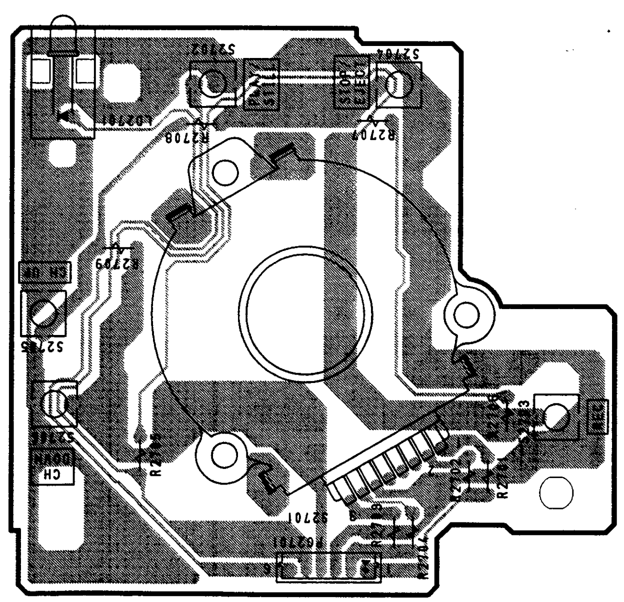
※ONE VOLTAGE:PB OR REC MODE
TWO VOLTAGES:PB AND (REC) MODE
NOTE:MARK"•" IS LEADLESS(CHIP) COMPONENT

SWITCHING REGULATOR [MAS]

LCD. SHU CIRCUIT BOARDS



LCD(LCD DISPLAY)
[PATTERN No.JK1165-4]



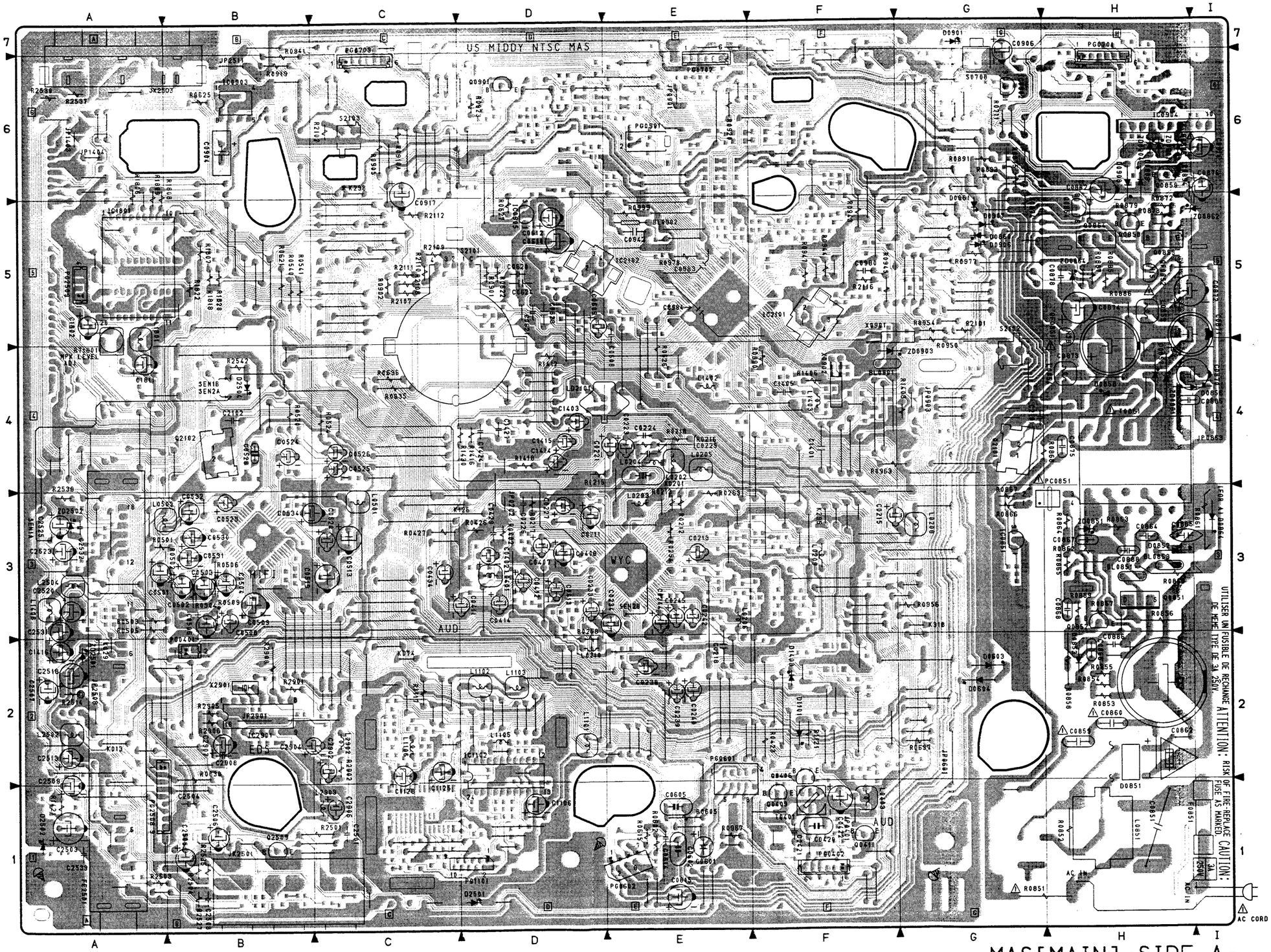
SHU(SHUTTLE SWITCH)
[PATTERN No.JK1166-4]

IDENTIFICATION OF PARTS LOCATION

LCD [LCD DISPLAY]

Symbol No.	Parts Location
C	
C1701	1A
C1702	1A
C1703	1A
C1704	1A
C1705	1A
C1706	1A
D	
D1701	1A
IC	
IC1701	1A
IR	
IR1701	1A
L	
L1701	2A
LCD	
LCD1701	3A
LD	
LD1701	2A
LD1702	3A
LD1703	3A
LD1704	4A
LMP	
LMP1701	2A
LMP1702	3A
LPM	
LPM1703	4A
PG	
PG1702	4A
PG1703	1A
Q	
Q1701	3A
Q1702	3A
R	
R1701	2A
R1702	1A
R1703	3A
R1704	2A
R1708	4A
R1709	3A
R1710	4A
R1711	1A
R1712	1A
R1713	1A
R1714	4A
S	
S1701	1A

MAS CIRCUIT BOARD [SIDE A]


US MIDDY NTSC MAS
WYC
AUD
UTILISER UN FUSIBLE DE RECHANGE ATTENTION: RISK OF FIRE-REPLACE FUSE AS MARKED. CAUTION: DE MEME TYPE DE 3A 250V.
AC CORD

MAS [MAIN] -SIDE A-
[PATTERN No.JA1243-8]

IDENTIFICATION OF PARTS LOCATION

MAS [MAIN]

Symbol No.	Parts Location
BL	
BL0851	A-3H
BL0853	A-3H
BL0901	A-4F
BL0902	A-5E
C	
C0201	B-3F
C0203	B-3E
C0204	B-3F
C0205	B-3F
C0206	B-3E
C0208	B-3D
C0209	B-3E
C0211	A-3D
C0212	B-2F
C0213	A-3E
C0214	B-2F
C0215	A-3F
C0216	B-2F
C0218	A-2E
C0219	B-2F
C0220	B-3F
C0221	A-4E
C0222	B-4E
C0223	A-4E
C0224	A-4E
C0225	A-4E
C0226	A-3D
C0227	A-3D
C0228	B-3D
C0230	B-3D
C0233	A-3D
C0234	A-3E
C0235	B-3D
C0236	B-3E
C0237	B-2E
C0238	A-2E
C0239	A-2E
C0240	A-2E
C0241	B-2E
C0242	A-3E
C0243	B-3E
C0244	A-3E
C0245	A-3E
C0246	B-3E
C0247	B-3E
C0249	B-3E
C0251	B-3E
C0252	B-3E
C0254	B-3E
C0255	B-3E
C0256	B-3E
C0260	B-3E
C0262	B-2C
C0263	B-3E
C0264	B-3F
C0265	B-2F
C0273	B-2D
C0402	A-3D
C0403	B-3D
C0404	B-3D
C0406	B-3D
C0407	A-3D
C0408	A-3D
C0409	B-3D
C0410	B-3D
C0411	A-3D
C0412	A-3D
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R2904	B-2B
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R2906	A-2B
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R2908	A-2B
R2909	B-2B
RT	
RT1801	A-5A
S	
S0708	A-6G
S2101	A-5C
S2102	A-4G
S2103	A-6C
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T0851	A-4H
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X0201	A-4E
X0901	A-5F
X0902	A-4F
X2901	A-2B
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ZD0851	A-3H
ZD0861	A-4H
ZD0862	A-5I
ZD0864	A-5H
ZD0901	A-6H
ZD0903	A-4F
ZD0904	A-6H
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ZD2502	A-3A

IDENTIFICATION OF PARTS LOCATION

MAS [MAIN]

Symbol No.	Parts Location
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C0209	B-3E
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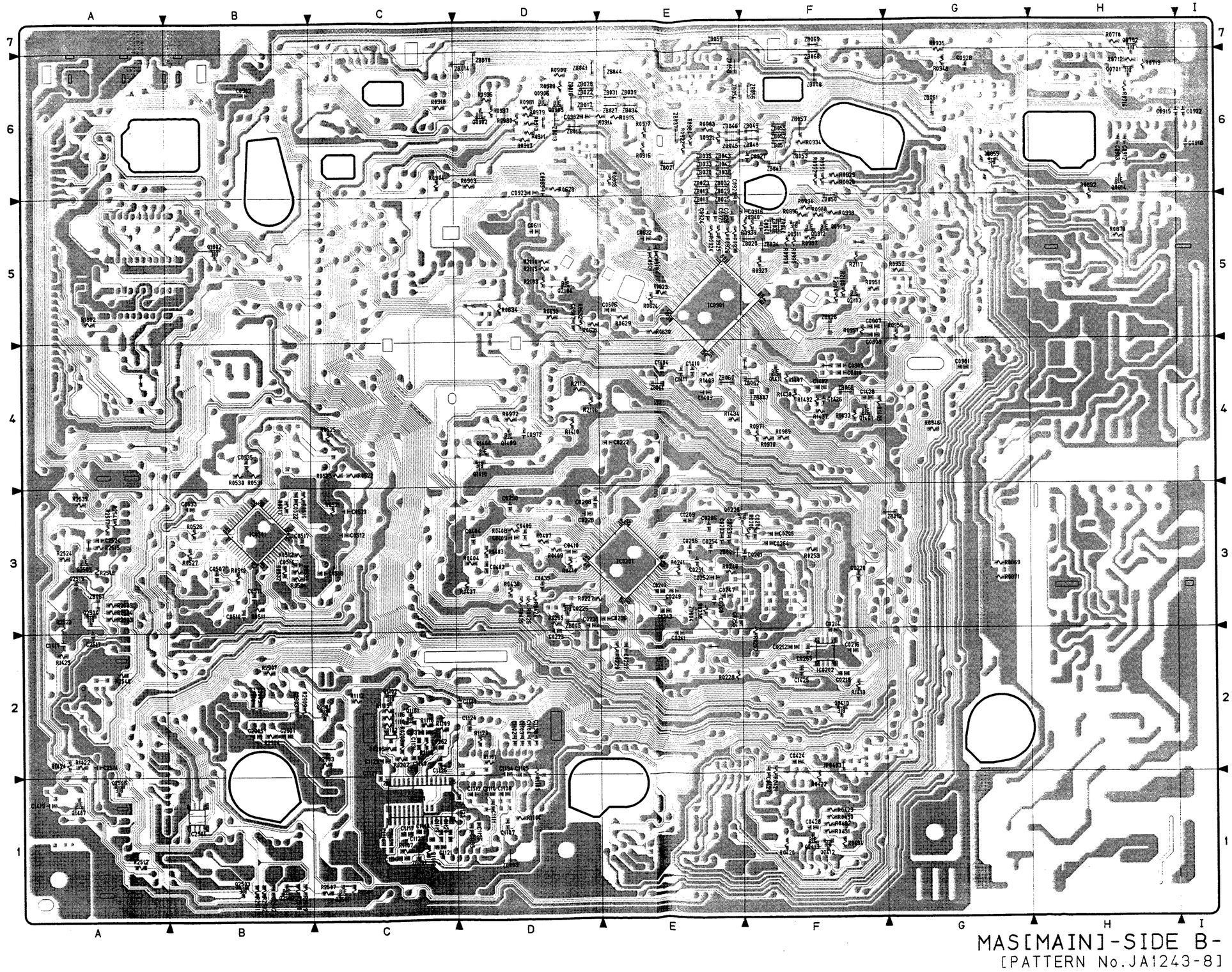
MAS CIRCUIT BORAD [SIDE B]



MAS [MAIN] -SIDE B-
[PATTERN No.JA1243-8]

HITACHI

VT-FX624A TK No. 4706E Image & Information Media Systems Division, Tokai

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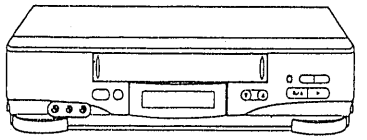
HITACHI

SERVICE MANUAL

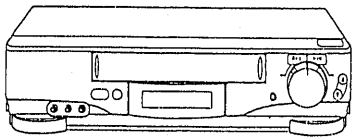
TK | No.4601E

VT-FX610A
VT-FX611A
VT-FX613A

US MECHANISM



– VT-FX610A/FX611A –



– VT-FX613A –

This service manual does not include information on the US Mechanism used in this model. Refer to the following manual for the US Mechanism.

Manuals to be referred
VT-FX610A/FX611A/FX613A

Name of manual	Manual No.
US Mechanism	4527E

VHS

This video deck is a VHS type video recorder. For proper operation, only the VHS type cassette must be used.

VCR Plus+ w/Cable Channel Changer

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO CASSETTE RECORDER

February 1996 Image & Information Media Systems Division, Tokai

VT-FX610A/FX611A/FX613A

SAFETY PRECAUTIONS

NOTICE: Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis.

1. When replacing a chassis in the instrument, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment covers/shields, isolation resistors/capacitors, etc.
2. When service is required, observe the original lead-dress. Extra precautions should be taken to assure correct lead dress in the high voltage circuit.
3. Always use the manufacturer's replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacturers'. Furthermore, where a short-circuit has occurred, replace those components that indicate evidence of overheating.
4. Before returning an instrument to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective or inadvertently defeated during servicing. Therefore, the following checks should be performed for the continued protection of the customer and service technician.

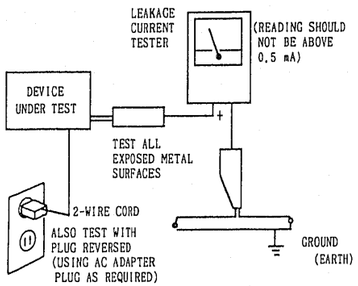
Leakage Current Cold Check

With the AC plug removed from the AC120V, 60Hz source, place a jumper across the two plug prongs. Turn the AC power switch on. Using an insulation tester (DC500V), connect one lead to the jumpered AC plug and touch the other lead to exposed metal parts (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of 0.3 Mohm and a maximum resistor reading of 5 Mohm. Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a AC120V, 60Hz outlet (do not use an isolation transformer for this check).

Turn the AC power switch on. , Using a "Leakage Current Tester", measure for current from all exposed metal parts of the cabinet (antennas, screwheads, metal overlays, control shaft, etc.), particularly an exposed metal part having a return path to the chassis, to a known ground (earth) (water pipe, conduit, etc.). Any current measured must not exceed 0.5 mA.


LEAKAGE CURRENT TESTER
(READING SHOULD NOT BE ABOVE 0.5 mA)
DEVICE UNDER TEST
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
GROUND (EARTH)

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE UNIT TO THE CUSTOMER.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts have special safety-related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for a higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual. Electrical components having such features are identified by marking with a ⚠ on the schematics and the parts list in this Service Manual. The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards. Product safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies for, HITACHI Service Manual may be obtained at a nominal charge from HITACHI SALES CORPORATION.

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SCHEMATIC AND CIRCUIT BOARD DIAGRAMS

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CHAPTER 1 GENERAL INFORMATION

Specifications

Format:	VHS
Video Signal System:	NTSC color EIA standard
Record/Playback System:	Video: 4 Heads
	Audio: VHS Hi-Fi stereo record/playback system
Tape Speed:	33.35mm/sec(SP), 16.67mm/sec(LP)(playback only),
	11.12mm/sec(EP)
RF Input:	UHF/VHF75 ohm
Tuner:	USA: 181 channel tuning ability* (125 cable channels)
	Canada: 178 channel tuning ability* (122 cable channels
Type:	Auto programming frequency synthesis
Power Input:	AC120V 60Hz
Power Consumption:	20W norminal (FX610A)
	22W norminal (FX611A/FX613A)
Cabinet Size:	
(For FX610A/FX611A)	14-15/16″ (W)×3-11/16″ (H)×10-11/16″ (D)
	38.0cm(W)×9.3cm(H)×27.1cm(D)
(For FX613A)	14-15/16″ (W)×3-11/16″ (H)×10-15/16″ (D)
	38.0cm(W)×9.3cm(H)×27.9cm(D)
Weight:	7.7lbs. (3.5kg)
Storage Temperature:	-4° F to 131° F
Operating Temperature:	41° F to 104° F
Accessories:	1 coaxial cable
	1 remote control unit
	2AA batteries

Design and specifications subject to change without notice.

Comparison with Previous Model

	Item	VT-FX610A/FX611A/FX613A	VT-UX605A
Video	Video recording/playback system	VHS	VHS
	Y/C separation	Comb filter	Comb filter
	YNR (noise reduction)	○	○
	CNR (noise reduction)	×	○
	Picture quality function	×	○
	Color edge clean circuit	×	○
	Vertical chroma correction	×	○
	New sync circuit	○ (PB)	○
	Picture control	×	○ (ULTRA VIEW ON/OFF)
	S-VHS quasi playback function	×	×
Jacks	Video/audio inputs (rear)	1/1	1/1
	Video/audio inputs (front)	1/1	1/1
	Video/audio outputs (rear)	1/1	1/1
	Video/audio outputs (front)	×	×
Prog.	VCR Plus + programming	○	○
	Number of timer programs	8 programs/1 year	8 programs/1 year
	Auto recording speed	×	×
Remote	Model	VT-RM611A (FX610A/FX611A) VT-RM613A (FX613A)	VT-RM605A
	Remote jog/shuttle	×/○(FX613A)	○/○
	VCR Plus + code guide channel memory	×	×
Miscellaneous	Auto clock setting	○(FX611A/FX613A)	○
	Jog/Shuttle dial on the VCR	×/○(FX613A)	○/○
	Cable box control	○(FX613A)	○
	Tape navigation	×	○
	Closed caption	×	○
	Self-diagnosis	○ (6 modes)	○ (6 modes)
	No. of channels	181	181
	Backup time	1 hour	1 hour
	Front display (display tube)	LCD	LCD
	Synchro input jack	×	○ (front)
Mechanism	Basic chassis type	US	US
	Fast forward/rewind time (with T-120)	about 120 seconds	about 120 seconds
	Configuration of heads	DA4 heads + HiFi SP video : 2 (48/56μm) EP video : 2 (19/19μm) Audio : 2 (28/28μm)	DA4 heads + HiFi SP video : 2 (48/56μm) EP video : 2 (19/19μm) Audio : 2 (28/28μm)
	Material of heads	SP video : Ferrite EP video : Ferrite Audio : Ferrite	SP video : Ferrite EP video : Ferrite Audio : Ferrite
	Head cleaning roller	○	○

Comparison of Main Control ICs

Item	Function	VT-FX610A/FX611A/FX613A	VT-UX605A
Video	Y/chroma signal processing	HA118203F (IC201)	HA118401 (IC2201)
	CCD 1H delay	MSM7470-72MS-KR1 (IC202)	MSM7470-72MS-KR1 (IC2202)
	FM signal processing/EQ	Included in IC201	M52375P (IC2301)
	CNR	———	TA8898AN (IC2401)
	Linear Phase EQ/NAVI.data adder	Included in IC201	μPC5023CS-096 (IC2601)
	Video AGC	———	M51489L (IC2908)
FM audio	Audio signal processing	AN3964FB (IC501)	TA8863BF (IC5501)
	Level meter control	Included in IC501	Included in IC5501
Preamp	Video head switch	HA118198F (IC1101)	HA118191ANT (IC6101)
	Audio head amp	LA7256 (IC1102)	LA7256 (IC6301)
MTS/OSD	MTS decoder	HTS7337 (IC1801)	HTS7332A (IC1302)
	OSD control/Sync separator/AFC	Included in Main μP	Included in Main μP
Servo	Servo control	Included in Main μP	Included in Main μP
	FG/tach amp	Included in Main μP	Included in Main μP
System control	Main μP (system control μP)	HD6433977SA70F HD6433977SA66F (IC901)	HD6473977F HD6473977S (IC8901)
	VCR-EEPROM	ST24C01 (FX610A/FX611A) (IC903) ST24C02 (FX613A) (IC903)	ST24C02FM6 (IC8902)
	Loading motor drive	BA6209 (IC904)	XLA6209-V3 (IC8905)
Timer	Timer μP	Included in Main μP	Included in Main μP
	Display driver	BU9716K (IC1701)	LC75853NE (IC7501)
	Expander	———	HD49783FP (IC8904)
	Auto Clock	LC7455A (IC2901)	———
CCD	CCD μP	———	M37267M8-200SP (IC4301)
	NAVI.-EEPROM	———	X24C16S8 (IC4302)
	Reset	———	PST520C (IC4303)
	NAVI. sync separator	———	NM1108XF (IC4102)
	NAVI. data adder	———	Included in IC2601
Power supply	Switching driver	———	STR-S6705 (IC7101)
	A9V regulator	———	PQ30RV11 (IC7202)
	5V regulator	M5278L05 (IC905)	———

Tips for Servicing

Trouble Display Function

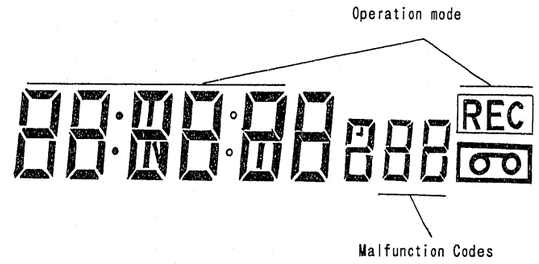
This VCR has a function which displays mechanism malfunctions, etc. in the LCD display. Use this function to analyze the cause when the power is shut off due to a malfunction, etc. in the mechanism.
Two types of information are displayed, ① The operation mode when the malfunction occurred, ② Malfunction Codes.

Procedure to display a malfunction

Press the "CHANNEL ▼" button on the VCR when the power is turned off and hold it; the malfunction code is displayed while the button is held depressed.

The details of the malfunction are displayed as follows.

LCD DISPLAY



[Display of Details of Malfunction]

Displayed No.	Item	Details
"00"	No malfunction	
"01"	FL mechanism lock	Malfunction in insertion/ejection of cassette
"02"	Capstan lock	Malfunction of capstan motor drive during tape unloading
"04"	Reel lock	Reel rotation trouble when tape is running
"05"	Cylinder lock	Cylinder rotation malfunction
"07"	Loading mechanism lock	Malfunction in shifting mechanism mode
"16"	Servo lock	Shorting of 5V detected

[Mode Display when Malfunction Has Occurred]

Mode	Display	Mode	Display
Stop	No display	Forward search	SRCH
Fast forward	FF	Reverse search	−SRCH
Rewind	REW	Slow motion play	SLOW
Recording	REC	Reverse motion slow play	−SLOW
Recording pause	REC (flashes)		
Playback	PLAY	Still motion play	STILL
Reverse playback	−PLAY		

No symbols are displayed if the malfunction occurred when a cassette was inserted or ejected, or the power was switched on from off, and off from on.

How to Remove the Cassette when a Malfunction Has Occurred in the Mechanism

If a cassette is caught in the mechanism because of a malfunction in the mechanism, remove it by the following procedure.

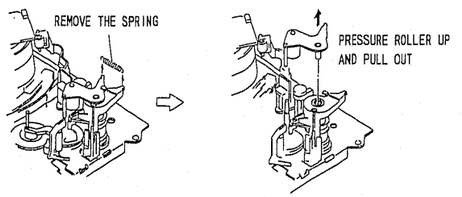
(Work Procedure)

1. Remove the top cover.
2. Remove the front panel.

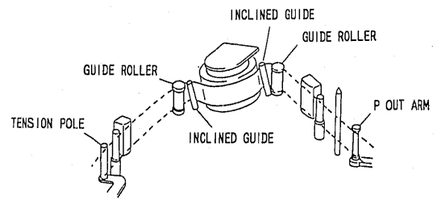
If the tape is wound round the cylinder in the loading state

If the cassette does not come out from the FL mechanism in the unloading state.

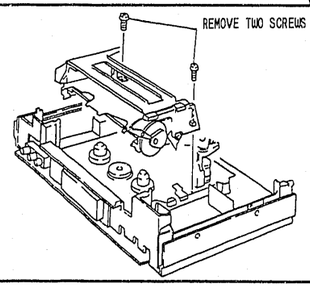
Remove the spring and lift the pressure roller to pull it out.



1) Slacken the tape and release it from the tension pole, guide rollers, inclined guides and P out arm.



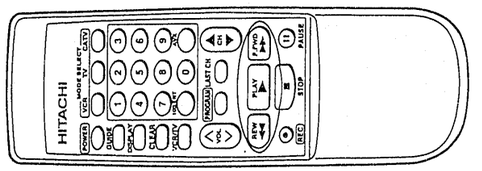
1) Remove two screws holding the FL mechanism.
2) Hold the cassette lid with your fingers so the tape is not damaged and remove the FL mechanism.
3) Remove the slack tape and eject the cassette.



Instructions on Use and Description of New Functions

The following are extracts from the instruction manual.

Remote Control Buttons [For VT-FX610A/FX611A]



POWER Turns the VCR on and off.

GUIDE Brings up an on-screen setup and programming guide, the Easy Guide System.

DISPLAY Used in on-screen programming and indexing.

CLEAR Used in on-screen programming and indexing.

VCR/TV Switches between viewing through the VCR and not viewing through the VCR.

VOLUME Increase or decrease the audio volume.

PROGRAM Used to program the timer for unattended recording.

REW Rewinds the videotape.

PLAY Starts playing a loaded videocassette.

REC Starts recording on the station the VCR is set to.

VCR, TV, CATV (MODE SELECT) Device buttons let you set the remote to control one of the three devices.

0 to 9 Number buttons used in on-screen programming. Can also be used to change channels. (Simply press 2 or 3 digits for the channel you want—such as 0 and 6 for channel 6, or 100/ENT and 2 and 4 for channel 124.)

AVX Used for recording from an auxiliary input such as a stereo system.

CHANNEL Top button switches to the next higher channel, bottom button switches to the next lower channel. For these to operate, you must have preset your channels.

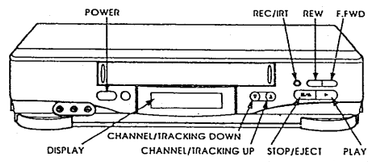
LAST CHANNEL Switches to the TV channel you watched previously during the current viewing session.

F.FWD Fast forwards the videotape.

STOP Stops a videocassette from playing, recording, pausing, rewinding—or anything it is doing.

PAUSE Temporarily stops the cassette from recording or playing. Press PAUSE again (or PLAY) to resume.

VCR Controls [For VT-FX610A/FX611A]



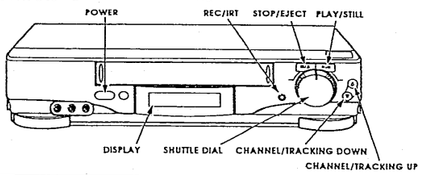
POWER	Turns VCR power on and off.
STOP/EJECT	Cancels any videotape action, and when pressed a second time, ejects tape.
PLAY	Plays the loaded videotape.
DISPLAY	Shows time, channel, and status indicators.
CHANNEL/ TRACKING	Up and down arrows for selecting channels. Used to adjust the tracking during playback.
REC/IRT	To begin recording
F.FWD	Fast forwards the videotape
REW	Rewinds the videotape

Display Indicators

Watch for these signs and symbols that let you know that the VCR is responding to your instructions.

L R	HI-FI Tape Playing
	Cassette Loaded
REC	Recording
REW	Rewind
FF	Fast-Forward
PLAY	Playback
STILL	Stop-Motion Play
SLOW	Slow-Motion Play
VCR	VCR Mode
SRCH	Forward Search
–SRCH	Reverse Search
REM	Remaining Tape Display
	Programmed to Record Later
L1 or L2	Signal Being Received Through Audio/Video Input Jacks on Front or Back of Unit

VCR Controls [For VT-FX613A]



POWER	Turns VCR power on and off.
STOP/EJECT	Cancels any videotape action, and when pressed a second time, ejects tape.
PLAY/STILL	Plays and pauses the loaded videotape.
DISPLAY	Shows time, channel, and status indicators.
CHANNEL/ TRACKING	Up and down arrows for selecting channels. Used to adjust the tracking during playback.
REC/IRT	To begin recording
SHUTTLE DIAL	Controls the videocassette's forward and reverse motion with one convenient dial.

Display Indicators

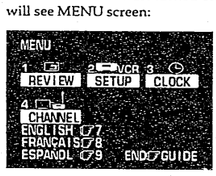
Watch for these signs and symbols that let you know that the VCR is responding to your instructions.

L R	HI-FI Tape Playing
	Cassette Loaded
REC	Recording
REW	Rewind
FF	Fast-Forward
PLAY	Playback
STILL	Stop-Motion Play
SLOW	Slow-Motion Play
VCR	VCR Mode
–PLAY	Reverse Playback
SRCH	Forward Search
–SRCH	Reverse Search
–SLOW	Reverse Slow-Motion Play
REM	Remaining Tape Display
	Programmed to Record Later
L1 or L2	Signal Being Received Through Audio/Video Input Jacks on Front or Back of Unit

Meet Your On-Screen Guide

Your Hitachi VCR has a special feature called the Easy Guide System. This feature guides you through simple setup and programming tasks right on the TV screen.

With the TV and VCR turned on, press GUIDE on the remote control. You will see MENU screen:



You may view all the on-screen instructions in English, French, or Spanish. When you first set up your VCR, it will be set to English. Press number 8 or 9 for the other language options.

Now, you will do most of your programming and setup by pressing numbers on the remote control which correspond to options presented in this and other on-screen menus. Instructions are easy to follow, and a white dash "—" will show you where your input is required.

- When you want to leave the Easy Guide System, simply press GUIDE several times. This will back you out to the normal TV viewing screen.
- If you don't press any button for a while, the VCR will switch you back to an earlier screen or to regular TV viewing.

Here is what the options mean.

1 REVIEW	Press 1 of the remote control to review the programs you have preset in the timer or erase them as required. (See page 43)
2 VCR SETUP	Press 2 to display the VCR SETUP screen and select the required sound from the VCR and its functions. (See page 26)
3 CLOCK	Press 3 to display the CLOCK SET screen and correct the VCR's clock. (See page 21)
4 CHANNEL	Press 4 to display the CHANNEL PRESET screen and preset channels. (See page 25) [For VT-FX610A/FX611A]
4 CHANNEL	Press 4 to display the CHANNEL PRESET screen and preset channels or set the cable box. (See page 25) [For VT-FX613A]
7 ENGLISH	Press 7 to display all option setting screens in English.
8 FRANCAIS	Press 8 to display all option setting screens in French.
9 ESPAÑOL	Press 9 to display all option setting screens in Spanish.

SERVICE MANUAL ABBREVIATION LIST

A	
ACC	Automatic Color Control
ACK	Automatic Color Killer
ADC B-Y	Analog to Digital Converted B-Y Signal
ADC R-Y	Analog to Digital Converted R-Y Signal
ADC Y	Analog to Digital Converted Luminance
ADD	Adder
ADRS	Address
A.DUB	Audio Dubbing
AF	Autofocus
AFC	Automatic Frequency Control
AGC	Automatic Gain Control
AGC KILLER	AGC Killer Voltage
ALC	Automatic Level Control
AIC	Automatic Iris Control
AM	Amplitude Modulation
AMP	Amplifier
APC	Automatic Phase Control
ASBL	Assemble (Phase Matching)
AUD.	Audio
AUX	Auxiliary
A5V	Always 5V B+ Source
B	
B (BLU)	Color Signal BLUE
BATT.	Battery
BF	Burst Flag
BG	Burst Gate or Back Ground
BGP	Burst Gate Pulse
BH	Power Supply for Selecting VHF High Band
BL	Power Supply for Selecting VHF Low Band
BLK	Blanking
BM	Power Supply for Selecting VHF Mid Band
BPF	Bandpass Filter
BS	Power Supply for Selecting VHF Super Band
BU	Power Supply for Selecting UHF Band
BU	Back-up
BUF.	Buffer Amplifier
B-YL	Battery
C	
C	Chroma
C (CHROMA)	Chrominance Signal
CAPST.	Capstan
CAS	Column Address Strobe
CARRI.	Carrier
CATV	Cable TV
C.BLANK	Chroma Blanking
C.BLK	Composite Blanking
CCD	Charge Coupled Device
CG	Character Generator
C.FG/CFG	Capstan Frequency Generater
C.FREE RUN	Chapstan Free Run
CH	Channel
CHD	Camera Horizontal Drive Pulse
CHAR.	Character
CHROMA	Chrominance
C.MEMORY	Counter Memory
CNR	Chroma Noise Reducer
COM.	Common
COM.	Composite
COMPA	Comparator
COMPE	Compensator
COMPO	Composite
COMP-EXP	Compressor-Expander
CONV.	Converter
CONT	Control
CORR.	Correlation
COUNT.	Counter
CP	Clamp Pulse
C.PAUSE	Camera Pause
C/R	Capacitor/Resistor
C.RESET	Counter Reset
C.REVERSE	Count Reverse
CST	Cassette

C	
C.SYNC	Composite Synchronizing Signal
CTL	Control Track Pulse (Control)
CYL	Cylinder
CY (CYAN)	Color Signal CYAN
D	
DA	Double Azimuth
D/A	Digital to Analog Converter
D-D	Direct Drive
DEEMPHA.	Deemphasis
DEF	Deflection
DEMOD.	Demodulator
DEMPX	Demultiplexer
DET	Detector
DIFF. AMP	Differential Amplifier
DISCRI.	Discriminator
DISP.	Display
DL	Delay Line
DN	Down
DO	Dropout
DOC	Dropout Compensator
DRAM	Dynamic Random Access Memory
D.REF 25/30	Delayed Reference 25/30Hz
D.SW 25/30	Delayed Switching 25/30Hz
DSP	Digital Signal Processor
DT/OE	Data Transfer/Output Enable
D/W	Dark/White
DWC	Delayed Write Clock
E	
EA-ROM	Electrically Alterable Read Only Memory
E-E	Electronic-to-Electronic
EMPHA.	Emphasis
EQ	Equalizer
EVF	Electronic Viewfinder
EXT.	External
F	
F.ADV	Frame Advance
F/V	Frequency-to-Voltage Converter
FB	Feed Back
FF	Flip Flop
F.FWD	Fast Forward
FG	Frequency Generator
FM	Frequency Modulation
FREQ.	Frequency
FRAME ADV	Frame Advance
Fsc	Color Sub Carrier Frequency
FWD	Forward
G	
GEN	Generator
GND	Ground
H	
H	Horizontal
HBF	Horizontal Burst Flag
HD	Horizontal Drive
Hi-Fi	High Fidelity
HLT	Halt
HPF	High-pass Filter
HPL	High-pass Limiter
HSS	Horizontal Sync. Separator
I	
IF	Intermediate Frequency
INC	Row Counter Increment
INDI.	Indicator
INT.	Internal
INV.	Inverter
I/O	In/Out (Input/Output)
IR	Infrared Rays
IRIS DET	Iris Detection
IRT	Instant Recording Timer
L	
LCD	Liquid Crystal Display
LIN.	Linear
LM	Loading Motor

L	
LNC	Line Noise Canceller
LOG	Logarithm
LP	Long Play
LP (H)	Long Play Signal (Active High)
LPF	Low-pass Filter
LUMA	Luminance
L/R	Left/Right
M	
MAN	Manual
M.BRAKE	Main Brake
M.CUT	Monitor Cut
MEM.	Memory
MEM ON	Memory ON
MEM SW	Memory Switch
MEM VIDEO	Memorized Video
MIX	Mixer
MMV	Monostable Multivibrator
MOD.	Modulator
MPX	Multiplex
MPX VIDEO	Multiplexed Video
M.STATE	Mechanism State
M.STOP	Memory Stop
MTS	Multi Channel Television Sound
N	
NEG	Negative
NFB	Negative Feed Back
NORM. or NOR.	Normal
NR	Noise Reduction
O	
OB	Optical Black
O/E	Odd/Even Field
OSC	Oscillator
OSD	On-Screen Display
P	
PB/PLAY	Playback
P.CONT	Power Control
PIF	Picture Intermediate Frequency
PG	Pulse Generator
P IN P	Picture in Picture
PIX MOVE	Picture Move
PLL	Phase Locked Loop
POS.	Positive
POWER CONT.	Power Control
PROG.	Program
PROTECT.	Protector
PWM	Pulse Width Modulation
R	
R (RED)	Color Signal RED
RAM	Random Access Memory
RAS	Row Address Strobe
RC	Reading Clock
RCC	Reading Clock Clear
RCR	Row Counter Reset
REC	Record
RECT.	Rectifier
REF	Reference
REF 25/30	Reference 25/30Hz from servo circuit
REG	Regulator
REL	Refresh Control
REW	Rewind
REV	Reverse
RF	Radio Frequency
RM	Reel Motor
ROM	Read Only Memory
R-YL	Color Difference Signal R-YL
S	
SAP	Second Audio Program
SAW	Sawtooth
SC	Serial Control
SC1 (0°)	3.58MHz Subcarrier Signal 1 (0-degree Phase Shifted)

S	
SC2 (90°)	3.58MHz Subcarrier Signal 2 (90-degree Phase Shifted)
SEP.	Separator
SG	Signal Generator
S/H	Sample and Hold
SIF	Sound Intermediate Frequency
SOL	Solenoid
SP	Standard Play
SP/LP	Standard Play/Long Play
S.REEL	Supply Reel Sensor
SRCH	Search
SRV	Servo
STABI.	Stabilizer
S.TRACK	Slow Tracking
STBY	Standby Mode
S-VHS	Super VHS
SW 15Hz	15Hz Head Switching Pulse
SW 25/30Hz	25/30Hz Head Switching Pulse
SYNC	Synchronizing signal
SYS.CON	System Control
T	
T (TELE)	Telephoto Angle
T.BRAKE	Take-up Brake
T/L	Tuner/Line
TP	Test Point
T.REEL	Take-up Reel Sensor
T.RESET	Timer Reset
TRS	Transfer
TμP	Timer Microprocessor
TU-μP	Tuning Microprocessor
U	
U/D	Up/Down
UNI.	Unified
V	
V (VERT)	Vertical
VAR	Variable
V.AGC	AGC Voltage
VCA	Voltage Controlled Amplitier
VCO	Voltage Controlled Oscillator
V.DRV	Vertical Drive Pulse
V.DUB	Video Dubbing
V/F	Voltage to Frequency Converter
VHS	Video Home System
VF	Focus Voltage
VOL.	Volume
V-REF	Voltage Reference
VP	Vertical Pulse
VSS	Vertical Sync. Separator
Vss	Voltage Super Source
VT	Tuning Voltage
VT-U	Tuning Voltage-UHF
VT-V	Tuning Voltage-VHF
VCXO	Voltage Controlled Crystal Oscillator
W	
WC	Write Clock
WCC	Write Clock Clear
WE	Weighting
WHT	Color Signal WHITE
WIDE	Wide Angle
WHD	Wide Horizontal Drive
WHT BAL CONT.	White Balance Control
Y	
Y	Luminance Signal
Y/C	Luminance/Chrominance
YE (YEL)	Color Singal YELLOW
YL	Luminance Signal (Low Component)
ANOTHER	
μP	Microprocessor
5V	ON 5V B+ Source
9V	ON 9V B+ Source

LEADLESS (CHIP) COMPONENT IDENTIFICATION

1. Leadless Transistor

The part name of a leadless transistor is indicated by a code on its surface, using one letter, one letter and one numeral, two letters, two letters and one numeral, two numerals, two numerals and one letter, three letters, or four letters.

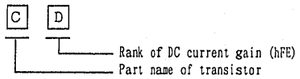
Note: There are transistors with the same code but differnt part names, or with the same part name but different codes. Refer to the parts lists to finally identify a transistor.

CODE	PART NAME	CODE	PART NAME
Leadless (Chip) Transistor			
3925	2SC3925	BR	2SC2412K
1CQ	2SB902	BR	2SC4617
1D	2SC3127	BS	2SC2412K
1DS	2SD1328S	C-7	2SA811
1DT	2SD1328	C1G	KSC1623
1R	2SB970TX	CB	2SC3646
2BQ	2SK374PQ	CC	2SA1122C
2BR	2SK374QR	CC	2SC3647T
2Y	2SC3757	CC	2SC3647
2YQ	2SC4691	CD	2SA1122D
3N	2SK620	CE	2SA1122E
4N	XN5601	CK	2SD999
4Q	XN1B301	CP	2SC4097
4R	XN1C301	CQ	2SC2411K
5C	XN4601	CR	2SB710
5C	XP4601	CR	2SC2411
5H	XP4501	CR	2SB1219
5H	XN4501	D16	2SC1622A
5K	XP4401	D17	2SC1622A
5K	XN4401	D18	2SC1622A
5L	XN5501	DB	2SD1766
5N	XN6501	DE	2SC2463
5O	XN6401	DF	2SD1623
5R	XP1501	DF	2SD1898
5R	XN1501	DG	2SD1624
5S	XN1504	DK	2SB798
5V	XN1401	EC	2SA1022
5W	XN2501	F-2	2SC1009F2
5X	XN4504	F-3	2SC1009F3
7R	XN2401	F-4	2SC1009F4
7S	XN1601	FC	2SC2619
AA	2SD1757K	FR	2SA1774
AKQ	2SA1738	FR	2SA1037K
AKQ	2SA1806	FR	2SA1576R
AL	2SA1791	FS	2SA1037K
AM	2SC4656	GC	2SC2734
AO	2SB709AQR	GM	3SD1615
AQ	2SB709AQ	HQ	2SA1036K
AQ	2SB766	IC	2SC3016
AR	2SB1462	IRD	2SA1484
AR	2SB766	IS	2SB792S
AR	2SB709ARS	IT	2SB792T
AR	ASB1218R	L-4	2SC1623L4
AS	2SB766	L-5	2SC1623L5
AS	2SB709AS	L-6	2SC1623L6
B3	2SC1621B3	L-6	2SC2812L6
B4	2SC1621B4	L-7	2SC2812L7
BC	2SB1188	L5	MMBC1623L5
BD	2SB1121	L6	MMBC1623L6
BE	2SB1260	LB	2SC2462B
BF	2SB1123	LC	2SC2462C
BF	2SB1308	LD	2SC2462D
BG	2SB1124	LR	2SC2412KLN
BH	2SB1001	M-5	2SA812
BQ	2SB709A	M-6	2SA1179
BR	2SC4081R	MC	2SA1052MC

CODE	PART NAME	CODE	PART NAME
Leadless (Chip) Transistor			
MD	2SA1052MC-D	ZS	2SD874S
N3	2SC1653	VR	2SD968A
ND	2SD1306ND	W1	FMW1
NE	2SD1306NE	W10	FMW10
PD	2SA1171D	W2	FMW2
PS	2SD814	W3	FMW3
QB	2SC2620QB	WR	2SD602
QC	2SC2620QC	X1	UMX1
QO	2SC2714	X1	IMX1
R22	2SC4226	X2	IMX2
R22	2SC3356	Y1	FMY1
R32	2SC4227	Y12	2SA1464
R34	2SC3583	Y25	NTM3906
R42	2SC3585	Y3	FMY3
RB	2SC2618RB	YCD	2SK197
RC	2SC2618RC	YI	2SA1666
RK	2SC3357	YQ	2SD601YQ
S1	FMS1	YR	2SD601YR
S2	FMS2	YR	2SD1819R
SC	2SA1121	YR	2SD2216
SO	2SA1162	YS	2SD601YS
SP	2SC3082K	Z1	IMZ1
T1	IMT1	Z2	IMZ2
T1	UMT1	ZO	2SD874T
T2	IMT2	ZQ	2SD601A
UD	2SC2404	ZR	2SD874R
Digital Transistor			
3	DTC143TK	6C	UN9113
4	DTC114TK	6S	XP4113
6	DTC144TK	8B	UN5212
13	DTA143EK	8C	UN9213
14	DTA144EK	8C	UN2213
15	DTA124K	8S	XP4213
15	DTA124EU	9L	XP1213
16	DTA144EU	9L	XN1213
16	XDA144EK	A1	FMA1
16	DTA144EE	A1	UMA1
23	DTC143EK	A2	FMA2
24	DTC114EU	B2	UMB2
24	DTC144EK	B2	IMB2
25	DTC124EU	C2	FMC2
25	DTC124K	C5	FMC5
26	DTC144EE	D2	IMD2
26	DTC144EU	F52	DTB123
26	XDC144EK	G1	FMG1
33	DTA143XK	G2	FMG2
43	DTC143XK	G21	DTD113ZK
52	DTA123YK	G5	FMG5
60	UN511F	H03	DTC343TK
64	DTC114YK	H2	IMH2
80	UN521F	H2	UNH2
4P	XN1A312T	H27	DTC363EK
6B	UN5112	R04	KSR1104
6C	UN2113	R31	FP1L2Q
FET			
30	2SK621	WS	2SK322T
1FQ	2SK321FQ	WT	2SK322T
1FR	2SK321FQR	X15	2SK425
1KP	2SK316	X4	2SK94
2BQ	2SK663	XAF	2SK980FG
DY	2SK1579	YC	2SK197YC
JO	2SK208	YD	2SK197YD
K	3SK166	YE	2SK197YE
K4	2SK160K4	ZD	2SK217ZD
K5	2SK160K5	ZE	2SK217ZE
KB	2SK323		

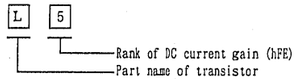
(1) Identification with two letters
Use this code and the following chart for transistor identification.
Example :

Code	Part name
CD	2SA1122D
LD	2SC2462D



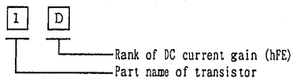
(2) Identification with one letter and one numeral
Use this code and the following chart for transistor identification.
Example :

Code	Part name
L5	2SC1623(5)
L6	2SC1623(6)



Example :

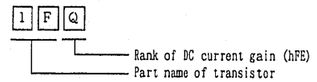
Code	Part name
1D	2SC3127D



Note: Codes S1, S2, T1, W1, W2, W3, X1, Y1, Y3, Z1 and Z2 encode only the part names.

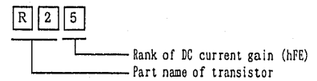
(3) Identification with one numeral and two letters
Use this code and the following chart for tarnsistor identification.
Example :

Code	Part name
1FQ	2SK321Q



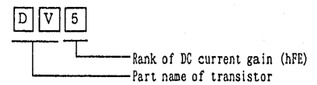
(4) Identification with one letter and two numerals
Use this code and the following chart for transistor identificaion.
Example :

Code	Part name
R25	2SC3356



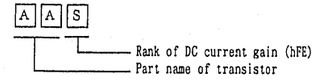
(5) Identification with to letters and one numeral
Use this code and the following chart for transistor identification.
Example :

Code	Part name
DV5	2SD596



(6) Identification with three letters
Use this code and the following chart for transistor identification.
Example :

Code	Part name
AAS	2SD1757KS



2. Leadless Diode

The part name of a leadless diode is indicated by a code on the surface, using one letter and one numeral, two letters, two letters and one numeral, two numerals and one letter, or three numerals. Use this code and the following table to identify the part name of a diode.

Note: Refer to the parts lists to finally identify a diode.

CODE	PART NAME	CODE	PART NAME
Diode			
0	HVU300A	3D	RB715F
1.0	1SV201	3.0L	MA3030L
2.0	MA3020	3.6L	MA3036L
5.1	MA3051L	3.9L	MA3039L
5.1	MA3051M	4.3H	MA3043H
6.8	MA3068	4.3L	MA3043L
6.8	MA3068M	4.3M	MA3043M
7.5	MA3075L	4.7L	MA3047L
8.2	MA3082M	4.7M	MA3047M
9.1	MA3091	5.1H	MA3051H
20	HZM6	5.1L	MA3051L
24	1SV221	5.1M	MA3051M
27	RD2.7M B	5.6M	MA3056M
30	RD3.0M B	6.2L	MA3062L
51	RD5.1M B2	6.2M	MA3062M
56	RD5.6M B	6.8H	MA3068H
91	RD9.1M B	6.8L	MA3068L
102	RD10M B2	6.8M	MA3068M
122	RD12M B2	6.8M	MA3068
163	RD16M B3	7.5H	MA3075H
182	RD10M B2	7.5L	MA3075L
271	RD2.7M B	8A	UN221D
272	D2.7M B2	8.2H	MA3082H
301	RD3.0M B	8.2M	MA3082M
362	D3.6M B2	9.1M	MA3091M
391	D3.9M B1	9.1M	MA3091
512	RD5.1M B2	10L	MA3100L
561	RD5.6M B	10M	MA3100M
621	RD6.2M B1	11L	MA3110L
681	RD6.8M	12M	MA3120M
683	RD6.8M B3	13H	MA3130H
911	RD9.1M B	18M	MA3180M
2.7H	MA3027H	36M	MA3360
Zener Diode			
1A	MA110	M3A	MA199
A3	1S2835	MC	MA153
A4	HSM2836C	MC	MA143
A5	1S2837	MH	MA141K
A6	HSM2838C	MH	MA151K

CODE	PART NAME	CODE	PART NAME
	Zener Diode		
B	SB0505CP	MH	MA152K
B64	SFPB64	MI	MA132K
B74	SFPB74	MN	MA141WA
BE	1SV172	MN	MA152WK
C1	HSM88S	MN	MA151WA
C2	HSM276S	MO	MA132WA
C3	1SS226	MO	MA152WA
C4	HSM88WK	MP	MA133
F7	KV1470	MT	MA151WK
H5	HVM14	MT	MA141WK
J	SB07-03C	MU	MA132WK
K	DA221	MU	MA151WA
M1A	MA159	N	DAN222
M1C	MA158	N	DAN202T
M1M	MA721	NU	MA152WK
M1N	MA713DAT	P	DAP202T
M1P	MA714	S4	D1FS4
M2A	MA122	SA	SB10-05P
M2B	MA123	Z	DA106K

3. Leadless Resistor
The resistor value is indicated on its surface, using three numerals, or one letter and one numeral.

(1) Identification with three numerals
Read this code following the same procedure as when reading the color code on discrete resistors.

Example:

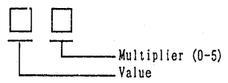
code	value
330	33 x 10^0 = 33 ohms
561	56 x 10^1 = 560 ohms
123	12 x 10^3 = 12K ohms
1R2	1 + 0.2 = 1.2 ohms (R: Decimal point)

(2) Identification with one letter and one numeral
Use this code and the following chart for resisitor identification.

Letter	Value	Letter	Value	Letter	Value
A	1	J	2.2	S	4.7
C	1.2	L	2.7	U	5.6
E	1.5	N	3.3	W	6.8
G	1.8	Q	3.9	Y	8.2

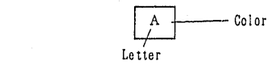
Example:

code	value
A1	1 x 10^1 = 10 ohms
G2	1.8 x 10^2 = 180 ohms
L3	2.7 x 10^3 = 2700 ohms
S4	4.7 x 10^4 = 47K ohms
W5	6.8 x 10^5 = 680K ohms



4. Leadless Capacitors
The capacitor value is indicated on its surface, using body color and one letter, or one letter and one numeral.

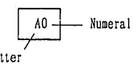
(1) Identification with body color and one letter



Body Color	Letter	Value	Body Color	Letter	Value
Red	A	1(PF)	Blue	A	100(PF)
	C	2		C	120
	E	3		E	150
	G	4		G	180
	J	5		J	220
	L	6		L	270
	N	7		N	330
	Q	8		Q	390
	S	9		S	470
Black	A	10(PF)		U	560
	C	12		W	680
	E	15		Y	820
	G	18	White	A	0.001(μF)
	J	22		E	0.0015
	L	27		J	0.0022
	N	33		L	0.0027
	Q	39		N	0.0033
	S	47		S	0.0047
	U	56		W	0.0068
	W	68	Green	A	0.01(μF)
	Y	82		E	0.015
				J	0.022
				N	0.033
				S	0.047
				U	0.056
				W	0.068
				Y	0.082
			Yellow	A	0.1(μF)

Example: Color / Letter / Value
Red / A / 1PF
Black / A / 10PF

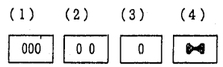
(2) Identification with one letter and one numeral



Letter/Numeral	Value	Letter/Numeral	Value
A0	1(PF)	A2	100(PF)
H0	2	C2	120
M0	3	E2	150
d0	4	G2	180
f0	5	J2	220
m0	6	L2	270
n0	7	N2	330
t0	8	Q2	390
y0	9	S2	470
A1	10(PF)	U2	560
C1	12	W2	680
E1	15	Y2	820
G1	18	A3	0.001(μF)
J1	22	E3	0.0015
L1	27	J3	0.0022
N1	33	N3	0.0033
Q1	39	S3	0.0047
S1	47	W3	0.0068
U1	56	A4	0.01(μF)
W1	68	E4	0.015
Y1	82	J4	0.022
		N4	0.033
		S4	0.047
		U4	0.056
		W4	0.068
		A5	0.1

Example: Letter/Numeral / Value
A0 / 1PF
A1 / 10PF

5. Leadless Jumper
The leadless jumper is indicated as shown below.



CHAPTER 2 DISASSEMBLY

1. Before Starting Disassembly

1) Unplug the power cord from the AC outlet.
2) [Removal procedure]
If a special procedure is required when dismantling any component, it is indicated using numbers. Follow the numbers (①, ②, ③ ...) shown in the illustrations.
[Reinstallation procedure]
Reinstall each component in the reverse order to removal when otherwise not specified.
3) Insert card connectors securely all the way as they are of the direct insertion type.

Identifications of Circuit Boards

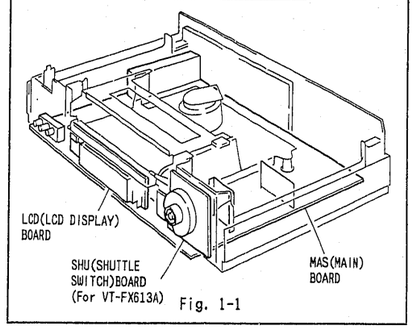


Fig. 1-1

2. Disassembly Method

When replacing defective parts, first refer to the "parts hierarchy chart" shown below. This chart shows the procedure for parts removal when replacing defective parts.

[How to use the parts hierarchy chart]
(1) Locate the part to be replaced.
(2) Check the parts in the ranks above the part to be replaced and start dismantling.
(3) Replace the defective part and reinstall the parts in the reverse order to that shown in the parts hierarchy chart.

Parts Hierarchy Chart

Note: Dismantle parts in the eject state.

Parts to remove	Item	Parts to remove	Item
Top cover	2-1		
Front Panel	2-1	Buttons	2-2
		Cassette door	2-2
		SHU board	2-3
Rear panel	2-1		
US-FL mechanism	2-1		
Front frame	2-4	LCD board	2-4
US mechanism/ MAS board assembly	2-5	US mechanism	2-6

Disassembly Procedure Diagrams

Item	Parts to remove
2-1	Top cover, front panel, rear panel and US-FL mechanism

◆ Caution when reinstalling the US-FL mechanism
Reinstall the US-FL mechanism in the state that the cassette holder is pulled forward.
(Otherwise, the switch arm could damage the FL switch on the MAS board.)

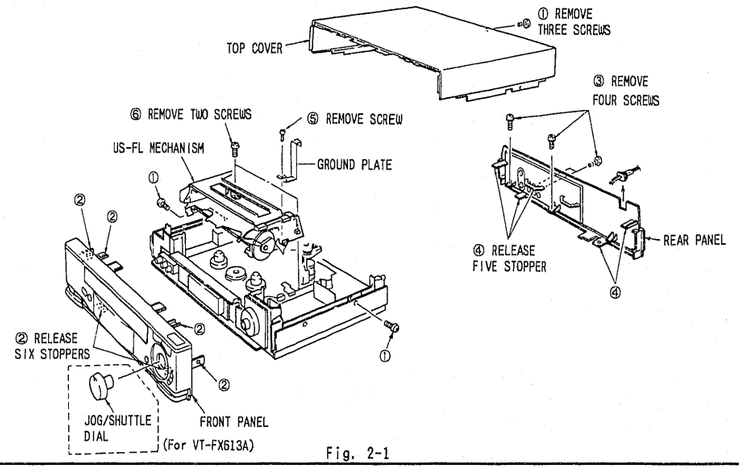


Fig. 2-1

2-2	Cassette door and buttons

◆ Caution when reinstalling the front panel
Reinstall the front panel in the state that the cassette door is pushed so the boss of the door arm comes to the front of the boss support of the cassette door.

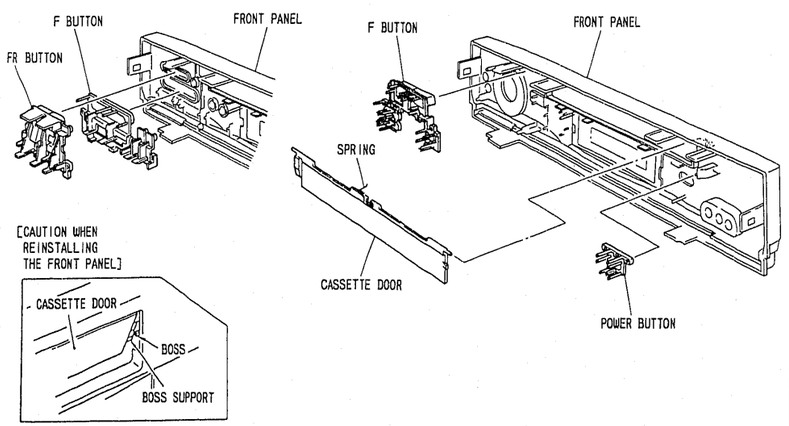


Fig. 2-2

Item	Parts to remove		
2-3	SHU board (For VT-FX613A)	2-4	Front frame and LCD board

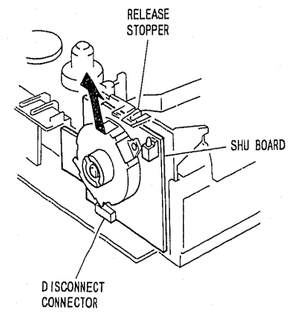


Fig. 2-3

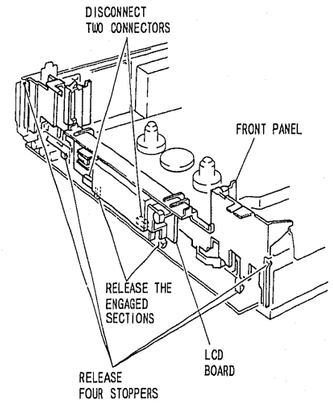


Fig. 2-4

2-5	US mechanism/MAS board assembly

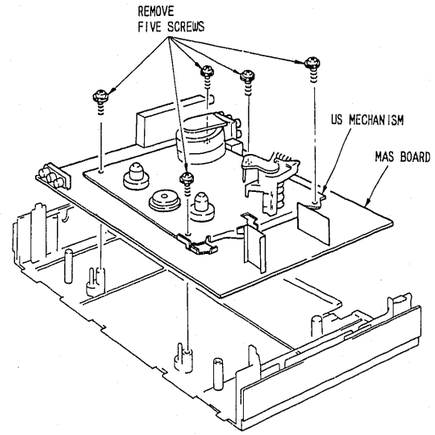


Fig. 2-5

Item	Parts to remove
2-6	Separation of MAS board from US mechanism

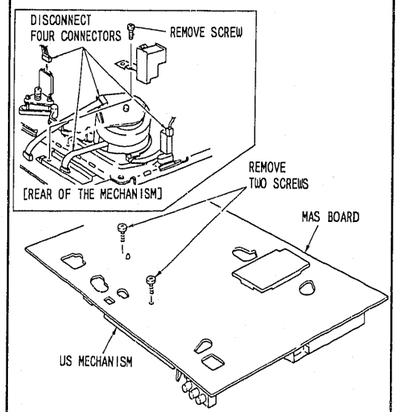


Fig. 2-6

Procedure to remove only the US mechanism

With this VCR the US mechanism can be removed without removing the MAS board. This is done by a different method from the normal disassembly method.

Parts to remove	Item
Top cover, Front panel and Rear panel	2-1
⇩	
US-FL mechanism	2-1
⇩	
Remove two screws on the bottom of the VCR.	2-7
⇩	
Remove five screws holding the US mechanism.	2-7
⇩	
Disconnect the connectors on the US mechanism and list the mechanism.	

2-7 Procedure to remove only the US mechanism

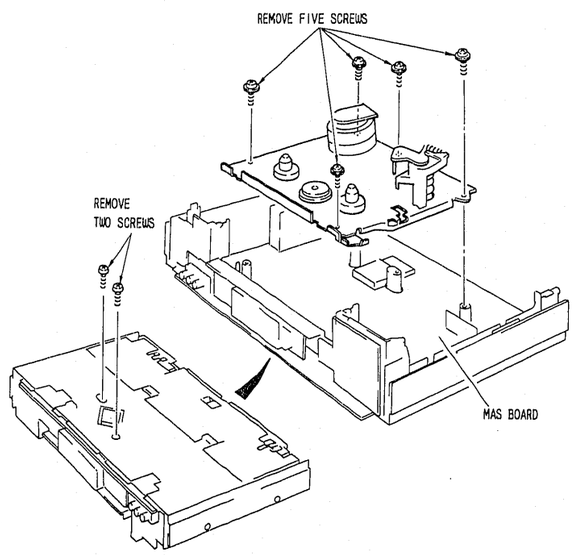


Fig. 2-7

3. Cautions When Reinstalling the US Mechanism

This VCR has mechanism sensors on the MAS board and the capstan and loading motors are connected via direct connectors. Therefore, when reinstalling the US mechanism, observe the following cautions.

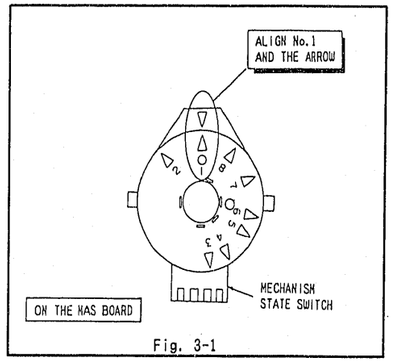


Fig. 3-1

(1) Align the ▽ mark and mode no. 1 of the mechanism state switch on the MAS board. (Mode no. 1 of the mechanism state switch has a click position.)

(2) Check that mode no. 1 on the P drive gear in the mechanism and the ▽ mark of the spring hook are aligned. If they are not aligned, turn the loading motor pulley to align them.

(3) Pass the end LED through the hole in the mechanism and install the mechanism from immediately above using the installation position holes as reference. Check that the boss of the mechanism state switch and the hole in the cam gear are aligned.

(4) Push the terminal sections (shaded sections ▨) of the capstan and loading motors and check that they are inserted securely.

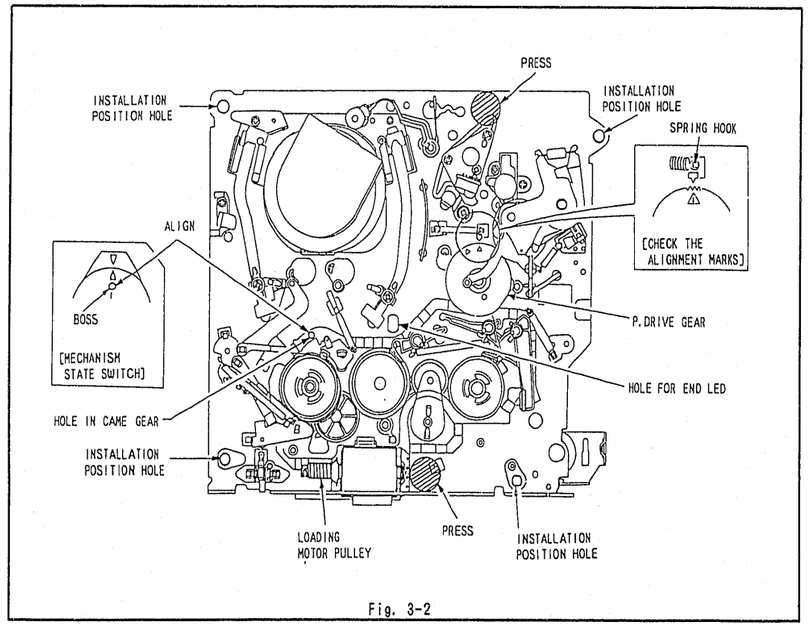


Fig. 3-2

CHAPTER 3 ELECTRIC CIRCUIT ADJUSTMENT

Servicing Positions

1. Servicing position during electrical adjustment

Perform electric adjustments of this VCR after removing the top cover, front panel and rear panel.

When the shield cover of the connector between the cylinder motor and MAS circuit boards is removed, noise appears in the played back picture.
Attach the shield cover when checking the picture on the screen.

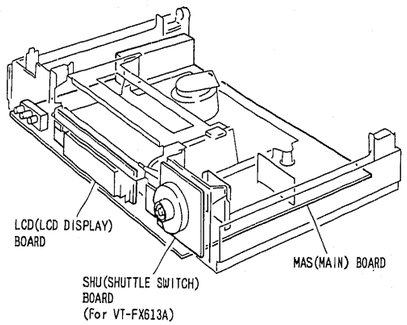


Fig. 1

2. Servicing positions when repairing and checking circuits

2-1. Procedure to set the SHU and LCD boards to the servicing positions (Fig. 2)

1) Remove the top cover and front panel.
2) Remove the rear panel.
3) Remove the SHU and LCD boards and front frame, then reattach the SHU and LCD boards.

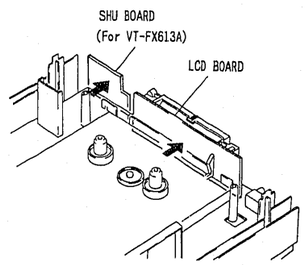


Fig. 2

2-2. Procedure to set the MAS board to the servicing position (Fig. 3)

1) Remove the top cover, front panel and rear panel.
2) Remove the US-FL mechanism and front frame.
3) Remove the MAS board, with the LCD and SHU boards and US mechanism assembled from the frame.
4) Turn over the MAS board and perform checks from the pattern side indicated by the arrow.
   Be careful of the following at this time.
   - Lay out an insulation sheet under the boards.
   - Attach the shield cover at the rear of the cylinder.

   Attach the US-FL mechanism when loading the tape.

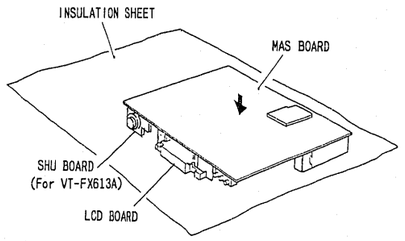


Fig. 3

3. Be careful of electric shocks

The power supply block on the right of the VCR has a heat sink which generates a high voltage. "HIGH VOLTAGE" is printed on the heat sink.
Take great care when handling this heat sink when the power is turned on during servicing.

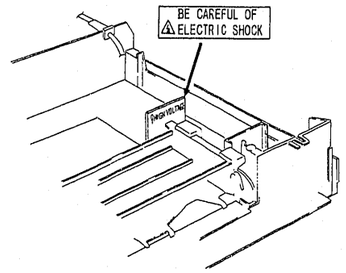


Fig. 4

Electrical Circuit Adjustment

1. Test equipment/jigs necessary for adjustment

1) Dual-trace oscilloscope
2) Color bar generator
3) Voltmeter
4) Monitor TV (with A/V jacks)
5) Alignment tapes:
   - NTSC tape: Part No. 7099046
   - 30HMP2-1 : Part No. 7099089
   - 24HMAF-2 : Part No. 7099153 (Hi-Fi alignment tape)
6) Blank tape
7) C/R oscillator

2. Cautions on adjustment

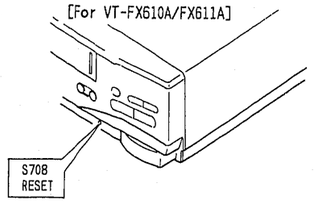
1) The following conditions apply when otherwise not specified.
   - Probe of oscilloscope: 10:1
   - Synchronization of oscilloscope: Internal sync
   - Ground of test equipment: PG2508 pin 6 (on MAS board)
2) When performing more than one adjustment, follow the specified order.

3. Tips for adjustment

3-1. Procedure to reset the main microprocessor

The main microprocessor is not reset even when the power cord is unplugged from the AC outlet because its power is backed up by a backup circuit. Press S708 on the MAS board to reset the entire microprocessor.
Do not press the reset switch with the power cord unplugged from the AC outlet as the slow tracking preset value could drift.
If the preset value drifts, plug the power cord into an AC outlet and press the reset switch again with the power turned on.
It is recommended that you press the reset switch after reinstalling the front panel.

[For VT-FX610A/FX611A]



[For VT-FX613A]

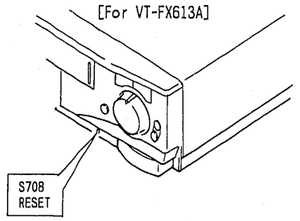


Fig. 5

3-2. Procedure to switch off the blue background function

1) Press the "GUIDE" button of the remote control to display the menu on the monitor TV screen.
2) Press 2 to select the VCR setup screen.
3) Press 1 to specify blue background off.

3-3. Procedure to obtain the EP head playback mode (X-value adjustment test mode)

Press the "1" and "4" buttons of the remote control provided simultaneously when an alignment tape is being played and hold them, then press the "CHANNEL ▽" button on the VCR; The VCR enters the EP head playback mode (X-value adjustment test mode).

4. Connections of test equipment

- Connect the test equipment as follows when otherwise not specified.

1) Connect a color bar generator to the video input 1 jack of the VCR.
2) Connect a monitor TV to the video output 1 jack of the VCR.
3) Connect a monitor TV (able to handle a stereo signal) to the audio output 1 jack.
4) Connect an antenna to the antenna jack and receive a TV broadcast (only for sound multiplex adjustment).

Test Points and Adjustment Points

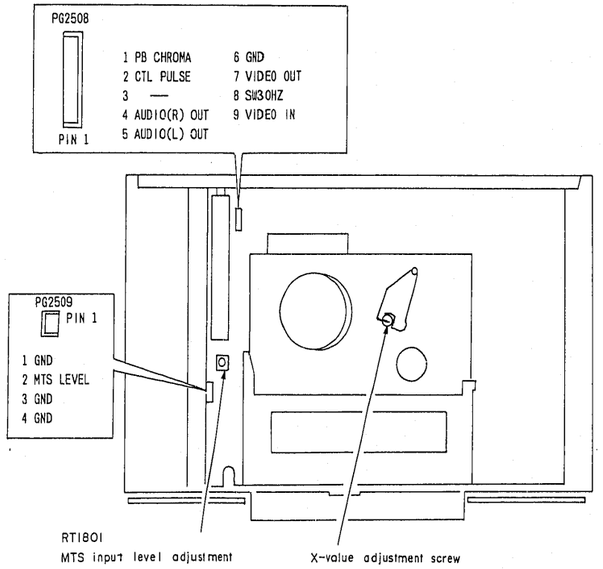


Fig. 6 MAS (Main) Circuit Board [Components Side]

The remote control provided with this VCR does not have a tracking button. The "CHANNEL △" and "▽" buttons operate as the tracking controls during playback.

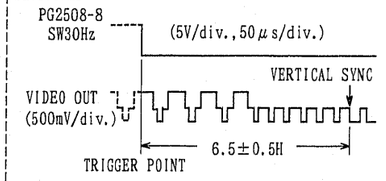
5. Servo Circuit Adjustments

5-1. Switching point adjustment (Fig. 6)

Purpose: To set the switching point of the video heads during playback to the center where the CH-1 and CH-2 envelopes overlap each other.		Fault due to incomplete adjustment: • Vertical sync signal is degraded and vertical jitter occurs. • Switching noise appears across the bottom of the screen.	
Test Equipment/Jigs	**Test Equipment Connection Points**	**State of VCR**	**Adjustment Point**
• Oscilloscope • Alignment tape (30HMP2-1)	• CH-1: Video out jack • CH-2: PG2508-8(SW30Hz)	1) Play the alignment tape 2) Set to the X-value adjustment test mode.	• F.FWD button (S702) • REW button (S703)

Adjustment Procedure
1) Play the alignment tape.
2) Press the "1" and "4" buttons of the remote control provided simultaneously and hold them, then press the "CHANNEL ▽" (S707) button of the VCR to set the VCR to the test mode. (SP is switched to LP in the display.)
3) Press the "F.FWD" and "REW" buttons of the remote control so the phase from the vertical sync to the trailing edge (trigger position) of the SW30Hz pulse is set to 6.5H±0.5H.
4) Press the STOP button to release the test mode.

Waveforms



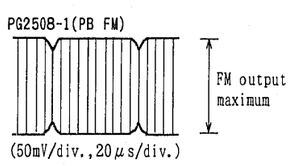
<Conditions of oscilloscope>
• Trigger with CH-2.
• Set the sync slope to "-".

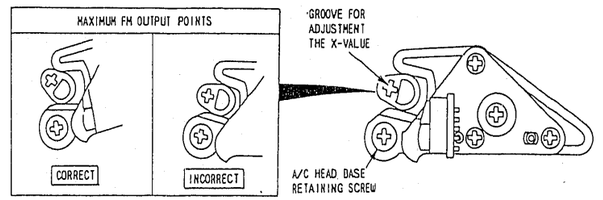
5-2. X-value adjustment (Fig. 6)

Purpose: To ensure compatibility with other VCRs.		Fault due to incomplete adjustment: • When a tape recorded by another VCR is played back, the tracking is not optimized and noise appears on the screen.	
Test Equipment/Jigs	**Test Equipment Connection Points**	**State of VCR**	**Adjustment Point**
• Oscilloscope • Alignment tape (30HMP2-1)	• CH-1: PG2508-1 (PB FM) • CH-2: PG2508-8 (SW30Hz)	1) Play the alignment tape. 2) Set to the X-value adjustment test mode.	• Groove for adjustment the X-value

Adjustment procedure
1) Play the alignment tape.
2) Press the "1" and "4" buttons of the remote control provided simultaneously and hold them, then press the "CHANNEL ▽" (S707) button of the VCR to set the VCR to the test mode. (SP is switched to LP in the display.)
3) Loosen the screw holding the A/C head base (do not loosen it excessively).
4) Insert a screwdriver into the groove for adjusting the X-value and adjust so the FM output is maximum. There are two maximum FM output points when the groove for adjusting the X-value is turned. Adjust the FM output to a maximum when the groove is at the correct position as shown in the figure below.
5) Press the STOP button to release the test mode.

Waveforms





5-3. Vertical jitter adjustment

Purpose:		Fault due to incomplete adjustment:	
・To suppress vertical jitter during slow and still play.		・Vertical jitter appears in the picture during slow and still play.	
Test Equipment/Jigs	Test Equipment Connection Points	State of VCR	Adjustment Point
・Monitor TV ・Color bar generator ・Blank tape	・Video output jack ・Video input jack	・Record a color bar signal and play it using the same VCR.	・CHANNEL △ (S706) ・CHANNEL ▽ (S707)

Adjustment procedure

<EP vertical jitter correction>: Record in the EP mode and play it back using the same VCR.

1) Press the PAUSE button to set the VCR to the still play mode.
2) Use the CHANNEL buttons of the VCR to suppress vertical jitter of the picture.

<SP vertical jitter correction>: Record in the SP mode and play it back using the same VCR.

1) Press the PAUSE button to set the VCR to the still play mode.
2) Use the CHANNEL buttons of the VCR to suppress vertical jitter in the picture.

5-4. Forward slow tracking preset adjustment

Purpose:		Fault due to incomplete adjustment:	
To adjust the timing with which the brake pulse of the capstan motor is generated during slow play so that noise is minimum.		・Noise appears during slow play and the picture is not clear.	
Test Equipment/Jigs	Test Equipment Connection Points	State of VCR	Adjustment Point
・Monitor TV ・Color bar generator ・Blank tape (T-120)	・Video output jack ・Video input jack	・Slow tracking: Unplug the power cord to set the slow tracking to the center.	・CHANNEL △ (S706) ・CHANNEL ▽ (S707)

Adjustment procedure

1) Record a signal on the middle of a T-120 blank tape in the EP mode and play it back using the same VCR.
2) Press the "1" and "4" buttons of the remote control (provided) simultaneously during playback and hold them, then press the "PLAY" button (S701) to set the VCR to the forward test slow mode.
3) Press the CHANNEL buttons so the slow feed noise appears across the bottom of the monitor screen and then it is driven out from the bottom of the screen.
4) Check that no noise appears on the monitor screen.
5) Press the "PLAY" button to return the VCR to the playback mode (the preset data is written to the EEPROM).
6) Perform the same procedure to perform slow tracking preset adjustment in the SP mode.

Do not press the reset switch after adjustment when the power is not turned on as the preset value could drift.
If the preset value drifts, turn the power on and press the reset switch again for recovery.

5-5. Reverse slow tracking preset adjustment

Purpose:		Fault due to incomplete adjustment:	
To adjust the timing with which the brake pulse of the capstan motor is generated during reverse slow play so that noise is minimum.		・Noise appears during reverse slow play and the picture is not clear.	
Test Equipment/Jigs	Test Equipment Connection Points	State of VCR	Adjustment Point
・Monitor TV ・Color bar generator ・Blank tape (T-120)	・Video output jack ・Video input jack	・Slow tracking: Unplug the power cord to set slow tracking to the center.	・CHANNEL △ (S706) ・CHANNEL ▽ (S707)

Adjustment procedure

1) Record a signal on the middle of a T-120 blank tape in the EP mode and play it back using the same VCR.
2) Press the "1" and "4" buttons of the remote control (provided) simultaneously during still play and hold them, then press the "PLAY" button (S701) to set the VCR to the reverse test slow mode.
3) Press the "CHANNEL" buttons so the slow feed noise appears across the bottom of the monitor screen and then it is driven out from the bottom of the screen.
4) Check that no noise appears on the monitor screen.
5) Press the "PLAY" button to return the VCR to the playback mode (the preset data is written to the EEPROM).
6) Perform the same procedure to perform reverse slow tracking preset adjustment in the SP mode.

Do not press the reset switch after adjustment when the power is not turned on as the preset value could drift.
If the preset value drifts, turn the power on and press the reset switch again for recovery.

6. Audio/MTS Circuit Adjustments

6-1. Hi-Fi audio playback level check

Purpose:		Fault due to incomplete adjustment:	
To set the playback level of the Hi-Fi audio signal to the specified value.		・The appropriate volume cannot be obtained during playback.	
Test Equipment/Jigs	Test Equipment Connection Points	State of VCR	Adjustment Point
・Voltmeter ・Hi-Fi alignment tape (24HMAF-2)	・When checking L-CH: Audio output (L) jack ・When checking R-CH: Audio output (R) jack	・Play Hi-Fi alignment tape.	———

Adjustment procedure

Use the same checking procedure for both the L and R channels.
Check that the voltmeter reads -7.8dBs±3.0dBs.
If it cannot be confirmed, check the playback signal system.

6-2. MTS input level adjustment

Purpose:		Fault due to incomplete adjustment:	
To set the level of the MPX signal supplied to the MTS processor in IC1801 from the tuner/IF to the specified level.		・The S/N deteriorates or distortion becomes conspicuous. ・Stereo separation deteriorates.	
Test Equipment/Jigs	Test Equipment Connection Points	State of VCR	Adjustment Point
・MTS sound signal generator ・Voltmeter	・IN FORM ANT ・PG2509-2	・E-E mode	・RT1801

Adjustment procedure

1) RT1801: Set the reading of the voltmeter to -20.0dBs±0.2dBs.

Notes:

MTS sound signal generator settings:
- ・Audio frequency: 300Hz
- ・Modulation signal: L+R

Monitor TV settings:
- ・Press the "GUIDE" button of the remote control to display the menu on the monitor TV screen.
- ・Press 2 of the remote control.
- ・Press 6 of the remote control to select the SAP option and switch it from OFF to ON.

List of Data in EEPROMs and Initial Settings

This VCR uses two EEPROMs. The table below lists the data stored in each ROM. It also shows the data set by shipment mode initialization, when the tape navigation map data is initialized and when the trouble display is cleared.

Information	Data memory ROMs		List of initial data	Remarks
	IC903 EEPROM	Shipment mode initial data	Clearing of trouble display	
Guide channel data	○			
Channel memory	○	○		
VCR mode select data	○	○		
Trouble display data	○	○	○	
Slow tracking data	○	× (set by adj.)		
Artificial V sync data	○	× (set by adj.)		
Switching point data	○	× (set by adj.)		
Cable box data	○	○		For VT-FX613A
Auto clock	○	○		For VT-FX611A/FX613A

List of Hidden Commands

The following tables list the mode setting commands during adjustment and EEPROM initial setting commands.

1. Mode setting commands during adjustment

Item	Mode in which command is accepted	Operation	Remarks
Tracking center	Play	Press the "CHANNEL △" and "▽" buttons on the VCR or the "1" and "4" buttons of the remote control simultaneously.	
X-value adjustment test mode	Play	Press the "1" and "4" buttons of the remote control simultaneously and press the "CHANNEL ▽ " button on the VCR.	
Forward test slow mode	Play	Press the "1" and "4"buttons of the remote control simultaneously and press the "PLAY" button on the VCR.	
Reverse test slow mode	Still play	Press the "1" and "4" buttons of the remote control simultaneously and press the "PLAY" button on the VCR.	

2. EEPROM initialization commands

Item	Mode in which command is accepted	Operation	Remarks
Shipment mode initial setting	EJECT	Press the "REC" button on the VCR and hold it, then press the "RESET" button used to initialize the microprocessor.	Hold the "REC" button depressed and release it after the display lights.
Clearing of trouble display	———	Press the "PLAY" button on the VCR and hold it, then press the "RESET" button used to initialize the microprocessor.	Hold the "PLAY" button depressed and release it after the display lights.

Initial Settings of IC903 (EEPROM)

The following shows the on-screen display and modes of switches when IC903 (EEPROM) is initialized.

```
[A] VCR SETUP MENU (in menu)              [C] CHANNEL PRESET (in menu)
   1 AUTO BLUE          [ ON ]                1 CHANNEL            [CATV1]
   4 AUDIO SETUP        [Hi-Fi]           [D] Front panel switches
   5 AUDIO SETUP        [STEREO]              ANT. OUT       : RF-3
   6 AUDIO SETUP        [SAP OFF]
[B] CLOCK SET (in menu)(For FX611A/FX613A)
   1 CLOCK SET          [AUTO]
   3 SET TIME ZONE      [AUTO]
   4 SET D.S.T          [AUTO]
```

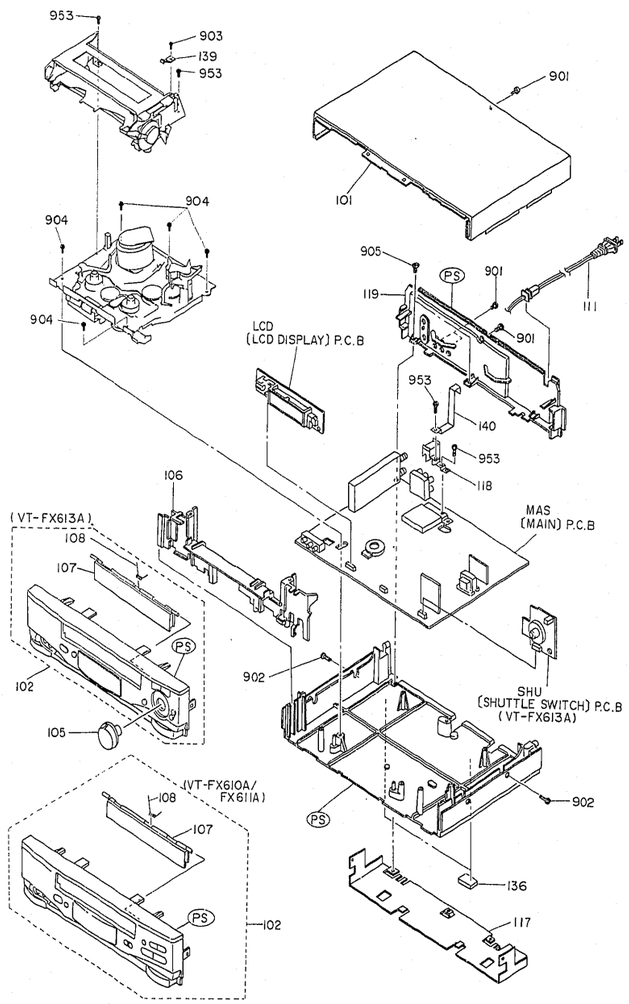
Caution When Replacing IC903 (EEPROM)

After replacing IC903 (EEPROM), execute the VCR initial settings and then perform the following adjustments.

	Adjustment	Page
1	Vertical jitter adjustment	P3-5
2	Forward slow tracking adjustment	P3-5
3	Reverse slow tracking adjustment	P3-5

CHAPTER 4 EXPLODED VIEWS

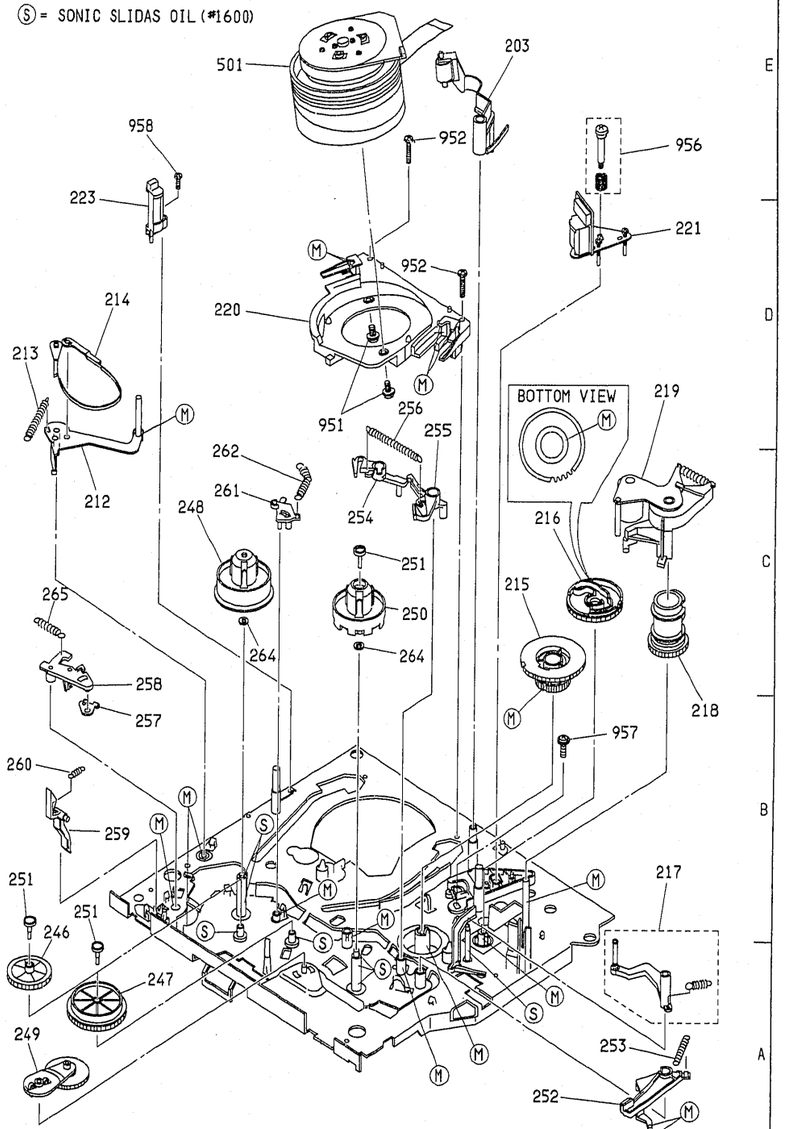
1 CABINET SECTION



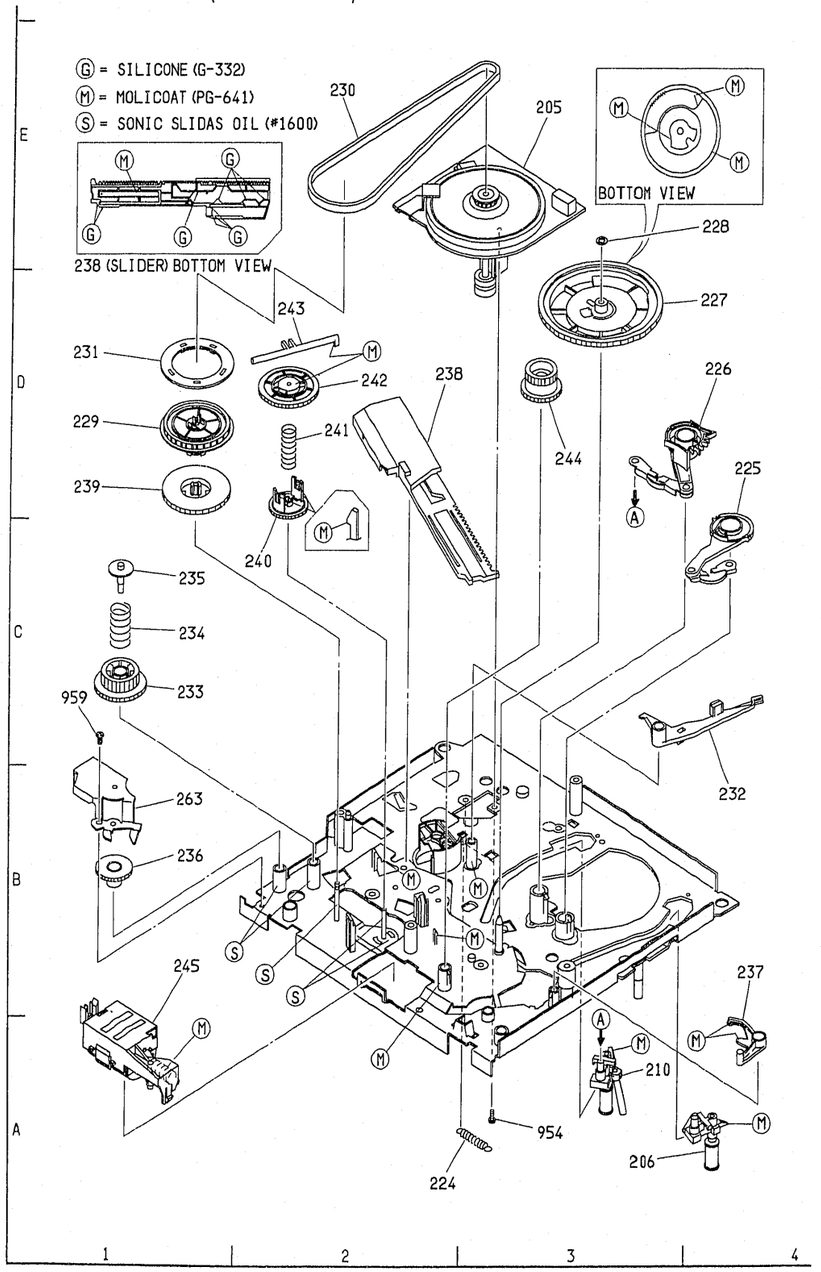
NOTE: The synthetic resin members that can be dismantled are shown by abbreviations using letters.

2. US - MECHANISM (TOP VIEW) SECTION

Ⓜ = MOLICOAT (PG-641)
Ⓢ = SONIC SLIDAS OIL (#1600)

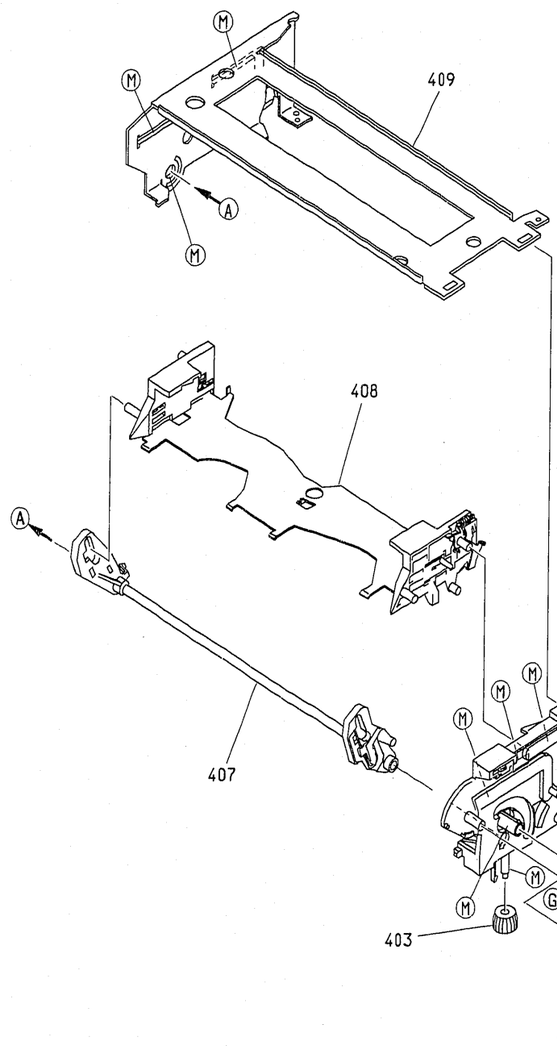


3. US - MECHANISM (BOTTOM VIEW) SECTION



4. US - FL MECHANISM SECTION

Ⓜ = MOLICOAT (PG-641)
Ⓖ = SILICONE (G-332)



CHAPTER 5 REPLACEMENT PARTS LIST

1. MECHANICAL PARTS LIST

Note: This parts list includes all components of four models. For the components that differ for each model, the end of the model name is indicated. (Example: VT-FX613A → 3)

SYMBOL-NO	P-NO	DESCRIPTION
		FOR FINAL ASSEMBLY
101	QA11161	COVER, TOP (HEPM)
102	PH13121	PANEL, FRONT[0]
102	PH13124	PANEL, FRONT (HEPM)[1]
102	PH13125	PANEL, FRONT (HEPM)[3]
105	PC11912	KNOB, SHUTTLE[3]
106	NT10481	PIECE, FRONT
107	PH13321	DOOR, CASSETTE (HEPM)
108	KL10651	SPRING, DOOR
111	EV10271	CORD, POWER (HEPM)
117	QA11141	COVER, BOTTOM
118	MD11281	COVER, CBA
119	PH13241	PANEL, REAR (HEPM)
136	4330714	FELT
139	4826833	SPRING, EARTH
140	MD11602	PLATE
203	KX11661	CLEANING, HEAD
205	GP10252	MOTOR, CAPSTAN
206	KX12293	BASE, GUIDE ROLLER(I)
210	KX12302	BASE, GUIDE ROLLER(O)
212	KX11531	ARM, TENSION
213	KL10662	SPRING
214	KX11631	BAND, TENSION
215	KF10641	GEAR, DRIVE
216	KF10701	GEAR, IDLER
217	KX12661	ARM, OUT
218	KX11581	GEAR, SPIRAL
219	KX11553	ARM, PINCH ROLLER
220	KX11451	BASE, CYLINDER
221	KX11941	AC HEAD
223	5423082	FE HEAD
224	KL10711	SPRING
225	KX11591	GEAR, LOADING(L)
226	KX11611	GEAR, LOADING(R)
227	KF10673	GEAR, CAM
228	4344643	WASHER
229	KX11442	PULLEY
230	KX11522	BELT
231	KF10631	FLANGE
232	KX12031	BRAKE
233	KF10571	GEAR, CHANGE
234	KL10771	SPRING
235	KX12001	STOPPER, SPRING
236	KF10561	GEAR, IDLER
237	KX11831	ARM, OPERATION
238	KX11363	SLIDER
239	KF10551	GEAR, TRANS
240	KF10501	GEAR, DRIVE
241	KL10772	SPRING
242	KF10513	GEAR, CHANGE
243	KX11411	ARM, CHANGE
244	KX11371	GEAR
245	KX11891	MOTOR, LOADING
246	KF10521	GEAR, IDLER 1
247	KF10531	GEAR, IDLER 2
248	KH10152	REEL, TABLE(S)
249	KX11423	ARM
250	KH10161	REEL, TABLE(T)
251	KX11991	STOPPER
252	KX11861	BRAKE
253	KL10782	SPRING, BRAKE
254	KX11875	BRAKE, L
255	KX11883	BRAKE, R
256	KL10792	SPRING, BRAKE
257	KF10542	GEAR, JOG
258	KX13132	ARM, JOG
259	KX11841	ARM, REC
260	6542482	SPRING
261	KX11811	BRAKE, SUB
262	KL10903	SPRING, SUB
263	KX12461	BRACKET, BASE
264	MN11571	
265	KL11061	SPRING, JOG
401	KX11771	BRACKET(R)
402	KF10682	GEAR 1
403	KF10691	GEAR 2
404	KX11751	ARM, DOOR
405	KX11761	ARM, SWITCH
406	6323723	SPRING
407	KX11931	ARM, DRIVE
408	KX11921	HOLDER, CASSETTE
409	KX11741	BRACKET(L)
501	HX10295	CYLINDER ASSY (CY-U6N1)
901	8699410	SCREW(3X10)
902	8679408	SCREW (3.0X8)
903	8671306	SCREW(2.6X6)
904	7781132	BT SCREW[0,3]
904	7781138	SCREW(3X10BT)[0,1]
905	7784323	SCREW(3X8)
951	8652408	SCREW (PSW3X8)
952	0671310	DT SCREW-2.6MMDX10MM
953	0671306	DT SCREW 2.6MMDX6MM
954	8691306	BT SCREW 2.6MM
956	KX12443	SCREW
957	MJ10341	SCREW(M2.6)
958	0671308	DT SCREW-2.6MMDX8MM
959	0671305	DT SCREW-2.6MMDX5MM
		FOR ACCESSARIES
802	EW10251	CORD, RF
803	HL10622	REMOTE HAND SET(VT-RM611A)(HEPM)[0,1]
803	HL10631	REMOTE HAND SET(VT-RM613A)(HEPM)[3]

2. ELECTRICAL PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION
		CAPACITORS
C0201	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0203	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0204	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0205	0893031	CERAMIC CHIP 1000PF+-10% 50V
C0206	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0208	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0209	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0211	0800138	ELECTROLYTIC 47UF 6.3V
C0212	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0213	0254458	ELECTROLYTIC 3.3UF+-20% 50V
C0214	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0215	0800115	ELECTROLYTIC 3.3UF 50V
C0216	0209948	CERAMIC CHIP 330PF+-5% 50V
C0218	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C0219	0893031	CERAMIC CHIP 1000PF+-10% 50V
C0220	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0221	0800112	ELECTROLYTIC 2.2UF 50V
C0222	0893039	CERAMIC CHIP 4700PF+-10% 50V
C0223	0800118	ELECTROLYTIC 4.7UF 35V
C0224	0890015	CERAMIC DISC 33PF+-50% 50V
C0225	0890026	CERAMIC DISC 220PF+-10% 50V
C0226	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C0227	0800107	ELECTROLYTIC 0.47UF 50V
C0228	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0230	0893002	CERAMIC CHIP 0.033UF+-10% 16V
C0233	0800122	ELECTROLYTIC 10UF 16V
C0234	0800185	ELECTROLYTIC 47UF 6.3V
C0235	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0236	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0237	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0238	0800178	ELECTROLYTIC 4.7UF 35V
C0239	0800179	ELECTROLYTIC 10UF 16V
C0240	0800179	ELECTROLYTIC 10UF 16V
C0241	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0242	0800178	ELECTROLYTIC 4.7UF 35V
C0243	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0244	0254455	ELECTROLYTIC 0.47UF+-20% 50V
C0245	0800177	ELECTROLYTIC 3.3UF 50V
C0246	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0247	0209936	CERAMIC CHIP 33PF+-5% 50V
C0249	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0251	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0252	0209944	CERAMIC CHIP 150PF+-5% 50V
C0254	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0255	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0256	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0260	0209933	CERAMIC CHIP 18PF+-5% 50V
C0262	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0263	0209931	CERAMIC CHIP 12PF+-5% 50V
C0264	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0265	0893008	CERAMIC CHIP 0.1UF +-10% 16V
C0273	0209937	CERAMIC CHIP 39PF+-5% 50V
C0402	0800117	ELECTROLYTIC 4.7UF 25V
C0403	0893002	CERAMIC CHIP 0.033UF+-10% 16V
C0404	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0406	0893037	CERAMIC CHIP 3300PF+-10% 50V
C0407	0800122	ELECTROLYTIC 10UF 16V
C0408	0800122	ELECTROLYTIC 10UF 16V
C0409	0209906	CERAMIC DISC 820PF+-5% 50V
C0410	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0411	0800109	ELECTROLYTIC 1.0UF 50V
C0412	0800101	ELECTROLYTIC 0.1UF 50V
C0413	0800101	ELECTROLYTIC 0.1UF 50V
C0414	0800109	ELECTROLYTIC 1.0UF 50V
C0420	0204337	CAPACITOR FILM 2700PF+-5% 100V
C0421	0890026	CERAMIC DISC 220PF+-10% 50V
C0422	0800335	ELECTROLYTIC 220UF 16V
C0424	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0427	0893037	CERAMIC CHIP 3300PF+-10% 50V
C0428	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0429	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C0434	0800117	ELECTROLYTIC 4.7UF 25V
C0435	0893033	CERAMIC CHIP 1500PF+-10% 50V
C0501	0800297	ELECTROLYTIC 22UF 6.3V
C0502	0800287	CAPASITOR 4.7UF+-20% 35V
C0503	0800287	CAPASITOR 4.7UF+-20% 35V
C0504	0800118	ELECTROLYTIC 4.7UF 35V
C0506	0800308	ELECTROLYTIC 33UF 16V
C0507	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0508	0800112	ELECTROLYTIC 2.2UF 50V
C0509	0800143	ELECTROLYTIC 100UF 6.3V
C0510	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0511	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0512	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0513	0800139	ELECTROLYTIC 47UF 10V
C0514	0893013	CERAMIC CHIP 0.22UF+-10% 16V
C0517	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0518	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0519	0800143	ELECTROLYTIC 100UF 6.3V
C0520	0800112	ELECTROLYTIC 2.2UF 50V
C0521	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0522	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0524	0800118	ELECTROLYTIC 4.7UF 35V
C0525	0800118	ELECTROLYTIC 4.7UF 35V
C0526	0800118	ELECTROLYTIC 4.7UF 35V
C0528	0880048	MYLAR 0.022UF+-10% 50V
C0529	0800122	ELECTROLYTIC 10UF 16V
C0530	0800291	ELECTROLYTIC 10UF 16V
C0531	0800291	ELECTROLYTIC 10UF 16V
C0532	0800317	ELECTROLYTIC 47UF 16V
C0533	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0534	0800135	ELECTROLYTIC 33UF 16V
C0535	0893046	CERAMIC CHIP 0.015UF+-10% 50V
C0601	0207453	ELECTROLYTIC 2.2UF 50V
C0602	0880018	POLYESTER FILM 0.22UF+-10% 50V
C0605	0890094	CERAMIC DISC 330PF+-10% 25V
C0606	0893031	CERAMIC CHIP 1000PF+-10% 50V
C0607	0209938	CERAMIC CHIP 47PF+-5% 50V
C0608	0890022	CERAMIC DISC 100PF+-10% 50V
C0609	0800179	ELECTROLYTIC 10UF 16V
C0610	0800141	ELECTROLYTIC 47UF 16V
C0611	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0612	0800128	ELECTROLYTIC 22UF 16V
C0614	0890035	CERAMIC DISC 1000PF+-10% 50V
C0615	0800317	ELECTROLYTIC 47UF 16V
C0620	0890035	CERAMIC DISC 1000PF+-10% 50V
C0621	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C0622	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0623	0890043	CERAMIC DISC 0.01UF+-20% 16V
C0624	0890044	CERAMIC DISC 0.022UF+80-20% 25V
△C0851	AN10201S	FILM CAPACITOR 0.1UF+-20% 250V
△C0859	0235992	CERAMIC DISC 2200PF 250V
△C0860	0235992	CERAMIC DISC 2200PF 250V
C0862	AL10192	ELECTROLYTIC 100UF 200V
C0864	AJ10134R	CERAMIC CAPACITOR 270PF+-10% 500V
C0865	0204284	ELECTROLYTIC 0.047UF 250V
C0866	0880053	POLYESTER FILM 0.047UF+-10% 50V

SYMBOL-NO	P-NO	DESCRIPTION
C0867	0880037	MYLAR 0.0033UF 50V
C0868	0880035	POLYESTER FILM 0.0022UF+-10% 50V
C0870	0254403	CAPACITOR 22UF+-20% 50V
C0871	0254405	CAPACITOR 1000UF+-20% 25V
C0872	0800354	ELECTROLYTIC 470UF 25V
C0873	0254405	CAPACITOR 1000UF+-20% 25V[0]
C0873	0254406	CAPACITOR 3300UF+-20% 10V[1,3]
C0874	0800354	ELECTROLYTIC 470UF 25V
C0875	0880044	POLYESTER FILM 0.01UF+-10% 50V
C0876	0800308	ELECTROLYTIC 33UF 16V
C0878	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C0882	0800047	ELECTROLYTIC 100UF 6.3V
C0885	AJ10131R	CERAMIC CAPACITOR 470PF+-10% 500V
C0888	1143004	CERAMIC CHIP 150PF+-5% 1KV
C0901	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0902	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0904	0217516	CAPACITOR 0.047UF+80-20% 5.5V
C0905	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0906	0800176	ELECTROLYTIC 2.2UF 50V
C0907	0209931	CERAMIC CHIP 12PF+-5% 50V
C0908	0209931	CERAMIC CHIP 12PF+-5% 50V
C0909	0209932	CERAMIC CHIP 15PF+-5% 50V
C0910	0209932	CERAMIC CHIP 15PF+-5% 50V
C0912	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0913	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0914	0800308	ELECTROLYTIC 33UF 16V
C0915	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0916	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C0917	0800141	ELECTROLYTIC 47UF 16V
C0918	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C0919	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0920	0209938	CERAMIC CHIP 47PF+-5% 50V
C0922	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0924	0209938	CERAMIC CHIP 47PF+-5% 50V
C0925	0209938	CERAMIC CHIP 47PF+-5% 50V
C0926	0209938	CERAMIC CHIP 47PF+-5% 50V
C0927	0209948	CERAMIC CHIP 330PF+-5% 50V
C0928	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C0940	0209943	CERAMIC DISC 120PF+-5%
C0972	0893086	CERAMIC CHIP 0.1UF+80-20% 50V
C0982	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1102	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1103	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1104	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1105	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1106	0800185	ELECTROLYTIC 47UF 6.3V
C1107	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1108	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1110	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1111	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1112	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1114	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1115	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1116	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1117	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1118	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1119	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1120	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1121	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1122	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1123	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1124	0893031	CERAMIC CHIP 1000PF+-10% 50V
C1125	0800185	ELECTROLYTIC 47UF 6.3V
C1126	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1127	0893013	CERAMIC CHIP 0.22UF+-10% 16V

SYMBOL-NO	P-NO	DESCRIPTION
C1128	0800185	ELECTROLYTIC 47UF 6.3V
C1129	0893091	CERAMIC CHIP 0.022UF+-10% 16V
C1131	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1134	0209930	CERAMIC CHIP 10PF+-0.5% 50V
C1135	0209930	CERAMIC CHIP 10PF+-0.5% 50V
C1136	0209930	CERAMIC CHIP 10PF+-0.5% 50V
C1137	0209935	CERAMIC CHIP 27PF+-5% 50V
C1138	0209943	CERAMIC DISC 120PF+-5%
C1140	0209938	CERAMIC CHIP 47PF+-5% 50V
C1141	0893031	CERAMIC CHIP 1000PF+-10% 50V
C1401	0890043	CERAMIC DISC 0.01UF+-20% 16V
C1402	0209943	CERAMIC DISC 120PF+-5%
C1403	0800118	ELECTROLYTIC 4.7UF 35V
C1404	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1405	0890043	CERAMIC DISC 0.01UF+-20% 16V
C1409	0209937	CERAMIC CHIP 39PF+-5% 50V
C1410	0209937	CERAMIC CHIP 39PF+-5% 50V
C1411	0209945	CERAMIC DISC 180PF+-5% 50V
C1414	0800122	ELECTROLYTIC 10UF 16V
C1415	0800118	ELECTROLYTIC 4.7UF 35V
C1416	0800317	ELECTROLYTIC 47UF 16V
C1417	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1419	0209930	CERAMIC CHIP 10PF+-0.5% 50V
C1424	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C1426	0893053	CERAMIC CHIP 0.047UF+-10% 50V
C1427	0890039	CERAMIC DISC 4700PF+-20% 16V
C1428	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C1701	0800185	ELECTROLYTIC 47UF 6.3V
C1702	0890103	CERAMIC DISC 47000PF+80-20% 12V
C1703	0890103	CERAMIC DISC 47000PF+80-20% 12V
C1704	0890103	CERAMIC DISC 47000PF+80-20% 12V
C1705	0890035	CERAMIC DISC 1000PF+-10% 50V
C1706	0800185	ELECTROLYTIC 47UF 6.3V
C1802	0800291	ELECTROLYTIC 10UF 16V
C1811	0800317	ELECTROLYTIC 47UF 16V
C2101	0890035	CERAMIC DISC 1000PF+-10% 50V
C2102	0890035	CERAMIC DISC 1000PF+-10% 50V
C2501	0890038	CERAMIC DISC 3300PF+-20% 16V
C2502	0893037	CERAMIC CHIP 3300PF+-10% 50V
C2503	0800073	ELECTROLYTIC 470UF 10V
C2504	0890043	CERAMIC DISC 0.01UF+-20% 16V
C2505	0800291	ELECTROLYTIC 10UF 16V
C2506	0800291	ELECTROLYTIC 10UF 16V
C2507	0800287	CAPASITOR 4.7UF+-20% 35V
C2508	0890038	CERAMIC DISC 3300PF+-20% 16V
C2509	0800287	CAPASITOR 4.7UF+-20% 35V
C2513	0800317	ELECTROLYTIC 47UF 16V
C2514	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2517	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2518	0800044	ELECTROLYTIC 47UF 50V
C2519	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2520	0800317	ELECTROLYTIC 47UF 16V
C2523	0800273	ELECTROLYTIC 0.22UF 50V
C2524	0893044	CERAMIC CHIP 0.01UF+-10% 50V
C2525	0800291	ELECTROLYTIC 10UF 16V
C2531	0800287	CAPASITOR 4.7UF+-20% 35V
C2532	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C2539	0890029	CERAMIC DISC 390PF+-10% 50V
C2901	0893031	CERAMIC CHIP 1000PF+-10% 50V[1,3]
C2902	0800109	ELECTROLYTIC 1.0UF 50V[1,3]
C2903	0893044	CERAMIC CHIP 0.01UF+-10% 50V[1,3]
C2904	0800122	ELECTROLYTIC 10UF 16V[1,3]
C2905	0893044	CERAMIC CHIP 0.01UF+-10% 50V[1,3]
C2906	0800122	ELECTROLYTIC 10UF 16V[1,3]
C2907	0800112	ELECTROLYTIC 2.2UF 50V[1,3]

SYMBOL-NO	P-NO	DESCRIPTION
C2908	0890035	CERAMIC DISC 1000PF+-10% 50V[1,3]
C2909	0209944	CERAMIC CHIP 150PF+-5% 50V[1,3]
C2910	0209944	CERAMIC CHIP 150PF+-5% 50V[1,3]
		RESISTORS
R0205	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R0207	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0208	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0212	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0213	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0215	0700039	CARBON FILM 820 OHM+-5% 1/8W
R0216	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R0217	0700059	CARBON FILM 27KOHM+-5% 1/8W
R0218	0700027	CARBON FILM 100 OHM+-5% 1/8W
R0227	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0228	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0229	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R0238	0103856	CHIP RESISTOR 12KOHM+-5% 0.1W
R0240	0103845	CHIP RESISTOR 1.5KOHM+-5% 0.1W
R0241	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R0253	0103841	CHIP RESISTOR 680 OHM+-5% 0.1W
R0254	0700075	CARBON FILM 390KOHM+-5% 1/8W
R0257	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R0258	0700027	CARBON FILM 100 OHM+-5% 1/8W
R0263	0101391	CARBON FILM 2.2MOHM+-5% 1/8W
R0265	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0402	0700059	CARBON FILM 27KOHM+-5% 1/8W
R0403	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0404	0103838	RESISTOR CHIP 390 OHM+-5% 0.1W
R0407	0103833	CHIP RESISTOR 150 OHM+-5% 0.1W
R0408	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R0409	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W
R0410	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0420	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0421	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0422	0103819	CHIP RESISTOR 10 OHM+-5% 0.1W
R0423	0700057	CARBON FILM 18KOHM+-5% 1/8W
R0424	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R0425	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R0427	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R0429	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0430	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0431	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0432	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0434	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R0435	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R0436	0103861	CHIP RESISTOR 33KOHM+-5% 0.1W
R0437	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R0501	0700054	CARBON FILM 10KOHM+-5% 1/8W
R0502	0700048	CARBON FILM 3.9KOHM+-5% 1/8W
R0503	0700063	CARBON FILM 47KOHM+-5% 1/8W
R0504	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0505	0700063	CARBON FILM 47KOHM+-5% 1/8W
R0506	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0509	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R0510	0104252	CHIP RESISTOR 510 OHM+-5% 1/10W
R0511	0104308	CHIP RESISTOR 15KOHM+-0.1% 1/16W
R0512	0104307	CHIP RESISTOR 11KOHM+-0.1% 1/16W
R0516	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0517	0104252	CHIP RESISTOR 510 OHM+-5% 1/10W
R0520	0700063	CARBON FILM 47KOHM+-5% 1/8W
R0521	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0522	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R0523	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION
R0524	0700054	CARBON FILM 10KOHM+-5% 1/8W
R0525	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R0526	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R0527	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R0530	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R0531	0103844	CHIP RESISTOR 1.2KOHM+-5% 0.1W
R0532	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0533	0103866	CHIP RESISTOR 82KOHM+-5% 0.1W
R0534	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0540	0700033	CARBON FILM 270 OHM+-5% 1/8W
R0541	0700033	CARBON FILM 270 OHM+-5% 1/8W
R0602	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0605	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R0615	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0621	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0622	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0623	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0624	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0625	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0626	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0627	0700036	CARBON FILM 470 OHM+-5% 1/8W
R0628	0700036	CARBON FILM 470 OHM+-5% 1/8W
R0629	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R0630	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R0631	0103870	CHIP RESISTOR 180KOHM+-5% 0.1W
R0632	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0633	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R0634	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0635	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0636	0700037	CARBON FILM 560 OHM+-5% 1/8W
R0637	0700044	CARBON FILM 1.8KOHM+-5% 1/8W
R0638	0700044	CARBON FILM 1.8KOHM+-5% 1/8W
R0704	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W[0,1]
R0705	0700039	CARBON FILM 820 OHM+-5% 1/8W[0,1]
R0706	0700041	CARBON FILM 1.0KOHM+-5% 1/8W[0,1]
R0707	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W[0,1]
R0708	0700046	CARBON FILM 2.7KOHM+-5% 1/8W[0,1]
R0709	0103833	CHIP RESISTOR 150 OHM+-5% 0.1W[0,1]
R0710	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W[3]
R0711	0700063	CARBON FILM 47KOHM+-5% 1/8W[3]
R0712	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W[3]
R0713	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W[3]
R0714	0103827	CHIP RESISTOR 47 OHM+-5% 0.1W[3]
R0715	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W[0,1]
R0716	0700047	CARBON FILM 3.3KOHM+-5% 1/8W[0,1]
△R0851	AT10231G	RESISTOR 4.7MOHM+-5% 1/2W
△R0852	AT10211M	CHIP RESISTOR 1MOHM 1/2W
R0853	0700074	CARBON FILM 330KOHM+-5% 1/8W
R0854	0700074	CARBON FILM 330KOHM+-5% 1/8W
R0855	0700074	CARBON FILM 330KOHM+-5% 1/8W
R0856	AT10244S	RESISTOR 0.47OHM+-5% 1W
R0857	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0858	AT10242S	RESISTOR 120 OHM+-5% 2W
R0860	0116664	CHIP RESISTOR 68KOHM+-5% 2W
R0861	0116664	CHIP RESISTOR 68KOHM+-5% 2W
R0862	0700047	CARBON FILM 3.3KOHM+-5% 1/8W
R0863	0700054	CARBON FILM 10KOHM+-5% 1/8W
R0864	0700033	CARBON FILM 270 OHM+-5% 1/8W
R0865	0700036	CARBON FILM 470 OHM+-5% 1/8W
R0866	0700034	CARBON FILM 330 OHM+-5% 1/8W
R0867	0700038	CARBON FILM 680 OHM+-5% 1/8W
R0868	0700055	CARBON FILM 12KOHM+-5% 1/8W
R0869	0104114	CHIP RESISTOR 3.3KOHM+-1% 0.1W
R0871	0105572	METAL FILM RESISTOR 2.7KOHM+-1% 1/10
R0872	0700045	CARBON FILM 2.2KOHM+-5% 1/8W

SYMBOL-NO	P-NO	DESCRIPTION
R0873	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R0874	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0875	0700032	CARBON FILM 220 OHM+-5% 1/8W
R0878	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0879	0700038	CARBON FILM 680 OHM+-5% 1/8W
R0885	0700056	CARBON FILM 15KOHM+-5% 1/8W
R0886	0700056	CARBON FILM 15KOHM+-5% 1/8W
R0887	0700046	CARBON FILM 2.7KOHM+-5% 1/8W
R0889	0700062	CARBON FILM 39KOHM+-5% 1/8W
R0891	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0892	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0893	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0894	0700058	CARBON FILM 22KOHM+-5% 1/8W
R0901	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0902	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0903	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0904	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R0905	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0906	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0907	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0908	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0909	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R0910A	0700047	CARBON FILM 3.3KOHM+-5% 1/8W[0]
R0910A	0700052	CARBON FILM 6.8KOHM+-5% 1/8W[1]
R0910A	0700056	CARBON FILM 15KOHM+-5% 1/8W[3]
R0911	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R0913	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0914	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0915	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0916	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0917	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0918	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0919	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0920	0700054	CARBON FILM 10KOHM+-5% 1/8W
R0921	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0922	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0923	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0924	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0925	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0926	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0928	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0929	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0934	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0935	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R0936	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0937	0103840	CHIP RESISTOR 560 OHM+-5% 0.1W
R0938	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R0939	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0940	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R0943	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0944	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0945	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0946	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0947	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0948	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0950	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0951	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0952	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0954	0700073	CARBON FILM 270KOHM+-5% 1/8W
R0955	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R0956	0700036	CARBON FILM 470 OHM+-5% 1/8W
R0957	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R0963	0700041	CARBON FILM 1KOHM+-5% 1/8W
R0967	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R0969	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W

SYMBOL-NO	P-NO	DESCRIPTION
R0970	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W
R0971	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R0972	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
⚠R0976	0101725	CHIP RESISTOR 2.2 OHM+-5% 1/4W
R0977	0700067	CARBON FILM 100KOHM+-5% 1/8W
R0978	0101765	RESISTOR 10KOHM+-1% 1/8W
R0979	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R0980	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R0981	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0983	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0984	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R0987	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W[0]
R0988	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R0990	0700067	CARBON FILM 100KOHM+-5% 1/8W
R0991	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W
R0992	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W
R0993	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0994	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R0995	0103852	CHIP RESISTOR 5.6KOHM+-5% 0.1W
R0996	0103847	CHIP RESISTOR 2.2KOHM+-5% 0.1W
R0997	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R0998	0103854	CHIP RESISTOR 8.2KOHM+-5% 0.1W
R0999	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1101	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R1103	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1104	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R1107	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R1108	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R1109	0103860	CHIP RESISTOR 27KOHM+-5% 0.1W
R1110	0103842	CHIP RESISTOR 820 OHM+-5% 0.1W
R1112	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1113	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1115	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W
R1116	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R1117	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1118	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R1120	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R1121	0700032	CARBON FILM 220 OHM+-5% 1/8W
R1403	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R1405	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1406	0700024	CARBON FILM 56 OHM+-5% 1/8W
R1407	0103837	CHIP RESISTOR 330 OHM+-5% 0.1W
R1409	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1410	0103846	CHIP RESISTOR 1.8KOHM+-5% 0.1W
R1412	0700076	CARBON FILM 470KOHM+-5% 1/8W
R1416	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R1418	0700027	CARBON FILM 100 OHM+-5% 1/8W
R1421	0700027	CARBON FILM 100 OHM+-5% 1/8W
R1422	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1423	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R1424	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R1430	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R1432	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R1433	0103851	CHIP RESISTOR 4.7KOHM+-5% 0.1W
R1434	0103879	CHIP RESISTOR 1MOHM+-5% 0.1W
R1437	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R1438	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R1440	0700052	CARBON FILM 6.8KOHM+-5% 1/8W
R1701	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1702	0700063	CARBON FILM 47KOHM+-5% 1/8W
R1703	0700032	CARBON FILM 220 OHM+-5% 1/8W[0]
R1703	0700036	CARBON FILM 470 OHM+-5% 1/8W[1,3]
R1704	0700032	CARBON FILM 220 OHM+-5% 1/8W[0]
R1704	0700036	CARBON FILM 470 OHM+-5% 1/8W[1,3]
R1708	0700049	CARBON FILM 4.7KOHM+-5% 1/8W[1,3]

SYMBOL-NO	P-NO	DESCRIPTION
R1709	0700034	CARBON FILM 330 OHM+-5% 1/8W[0]
R1710	0700034	CARBON FILM 330 OHM+-5% 1/8W[0]
R1711	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R1712	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R1713	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R1714	0700049	CARBON FILM 4.7KOHM+-5% 1/8W
R1802	0103853	CHIP RESISTOR 6.8KOHM+-5% 0.1W
R1806	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1807	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1808	0700053	CARBON FILM 8.2KOHM+-5% 1/8W
R1809	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1818	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1820	0700054	CARBON FILM 10KOHM+-5% 1/8W
R1822	0700054	CARBON FILM 10KOHM+-5% 1/8W
R2101	0700059	CARBON FILM 27KOHM+-5% 1/8W
R2102	0700067	CARBON FILM 100KOHM+-5% 1/8W
R2103	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R2104	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R2105	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R2106	0103893	CHIP RESISTOR 75 OHM+-5% 1/8W
R2107	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R2108	0700048	CARBON FILM 3.9KOHM+-5% 1/8W
R2109	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R2110	0700048	CARBON FILM 3.9KOHM+-5% 1/8W
R2111	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R2112	0700045	CARBON FILM 2.2KOHM+-5% 1/8W
R2113	0103893	CHIP RESISTOR 75 OHM+-5% 1/8W
R2114	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W
R2115	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R2116	0700054	CARBON FILM 10KOHM+-5% 1/8W
R2117	0103859	CHIP RESISTOR 22KOHM+-5% 0.1W
R2501	0700041	CARBON FILM 1.0KOHM+-5% 1/8W
R2502	0103843	CHIP RESISTOR 1KOHM+-5% 0.1W
R2503	0101400	CARBON FILM 75 OHM+-5% 1/8W
R2504	0700023	CARBON FILM 47 OHM+-5% 1/8W
R2507	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R2508	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R2509	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R2510	0103863	CHIP RESISTOR 47KOHM+-5% 0.1W
R2511	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R2512	0103850	CHIP RESISTOR 3.9KOHM+-5% 0.1W
R2514	0101835	CARBON FILM 1.5KOHM+-5% 1/4W
R2515	0103870	CHIP RESISTOR 180KOHM+-5% 0.1W
R2517	0103871	CHIP RESISTOR 220KOHM+-5% 0.1W
R2518	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R2523	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
R2524	0103849	CHIP RESISTOR 3.3KOHM+-5% 0.1W
R2527	0700063	CARBON FILM 47KOHM+-5% 1/8W
R2530	0700023	CARBON FILM 47 OHM+-5% 1/8W
R2533	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R2534	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R2535	0103839	CHIP RESISTOR 470 OHM+-5% 0.1W
R2536	0700019	CARBON FILM 27 OHM+-5% 1/8W
R2537	0700019	CARBON FILM 27 OHM+-5% 1/8W
R2538	0700025	CARBON FILM 68 OHM+-5% 1/8W
R2539	0103834	CHIP RESISTOR 180 OHM+-5% 0.1W
R2540	0103867	CHIP RESISTOR 100KOHM+-5% 0.1W
R2541	0103836	CHIP RESISTOR 270 OHM+-5% 0.1W
R2701	0700057	CARBON FILM 18KOHM+-5% 1/8W[3]
R2702	0700054	CARBON FILM 10KOHM+-5% 1/8W[3]
R2703	0700057	CARBON FILM 18KOHM+-5% 1/8W[3]
R2704	0700054	CARBON FILM 10KOHM+-5% 1/8W[3]
R2705	0700048	CARBON FILM 3.9KOHM+-5% 1/8W[3]
R2706	0700029	CARBON FILM 150 OHM+-5% 1/8W[3]
R2707	0700046	CARBON FILM 2.7KOHM+-5% 1/8W[3]

SYMBOL-NO	P-NO	DESCRIPTION
R2708	0700049	CARBON FILM 4.7KOHM+-5% 1/8W[3]
R2709	0700047	CARBON FILM 3.3KOHM+-5% 1/8W[3]
R2901	0700041	CARBON FILM 1.0KOHM+-5% 1/8W[1,3]
R2902	0700032	CARBON FILM 220 OHM+-5% 1/8W[1,3]
R2903	0103835	CHIP RESISTOR 220 OHM+-5% 0.1W[1,3]
R2904	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W[1,3]
R2905	0700081	CARBON FILM 1.0MOHM+-5% 1/8W[1,3]
R2906	0700047	CARBON FILM 3.3KOHM+-5% 1/8W[1,3]
R2907	0103831	CHIP RESISTOR 100 OHM+-5% 0.1W
R2908	0700027	CARBON FILM 100 OHM+-5% 1/8W[1,3]
R2909	0103855	CHIP RESISTOR 10KOHM+-5% 0.1W
RT1801	AW10188R	SEMI VARIABLE 22KOHM

SEMI-CONDUCTORS

D0603	5339231	DIODE 1SR35-100A
D0604	5339231	DIODE 1SR35-100A
⚠D0851	5336552	DIODE S1WBA60
D0852	CH10191M	DIODE EG01C-T
D0853	CH10481M	DIODE AG01Z
D0856	CH10481M	DIODE AG01Z
D0857	CH10462S	DIODE S3L20U
D0858	CH10641S	DIODE D3SB6M[1,3]
D0858	5339241	DIODE EK14[0]
D0860	5339551	DIODE SS1J4
D0861	5339551	DIODE SS1J4
D0864	CH10191M	DIODE EG01C-T
D0901	5339551	DIODE SS1J4
D0906	5339071	DIODE 1SS119
D0907	5339071	DIODE 1SS119
D0908	5339231	DIODE 1SR35-100A
D0909	5339231	DIODE 1SR35-100A
D1101	5339071	DIODE 1SS119
D1102	5328307	DIODE MA151WK
D1403	5339071	DIODE 1SS119
D1701	5339071	DIODE 1SS119
D2501	5339071	DIODE 1SS119
D2502	5339071	DIODE 1SS119
IC0201	CK14412U	IC HA118203NF
IC0202	CK13571R	IC MSM7470-72MS-KR1
IC0501	CK14421	IC AN3964FB
IC0851	1360452	IC TL431CLP
IC0901	CK14993	HD6433977SA70F
IC0902	CP10312R	IC PST9129
IC0903	CP10914	IC ST24C01FB6[0,1]
IC0903	CP10915	IC ST24C02FB6[3]
IC0904	CP10291	IC BA6209
IC0905	CP11361R	IC M5278L05
IC1101	CK14481	IC HA118198FP
IC1102	CP11191	IC LA7256
IC1701	CZ10181	IC BU9716K
IC1801	CS10351	PWB ASSY HTS7337
IC2101	CJ10211	PHOTO INTERLAPTER SG-236
IC2102	CJ10221	PHOTO INTERLAPTER SG-237
IC2501	CK13501R	IC NJM2533M
IC2901	CP11001	IC LC7455A[1,3]
IR1701	CW10173	MODULE TFM55380B
LD1701	CH10781R	DIODE SLP3117E
LD1702	CH10781R	DIODE SLP3117E
LD1703	CH10781R	DIODE SLP3117E
LD1704	CH10781R	DIODE SLP3117E
LD2101	CH10542	DIODE GL451L1
LD2701	CH10791	DIODE SLR932C-20[3]
⚠PC0851	1322421	PHOTOCOUPLER PC817A
Q0226	5328972	TRANSISTOR 2SC2412K-BRT

SYMBOL-NO	P-NO	DESCRIPTION
Q0406	5323172	TRANSISTOR 2SC1214CD
Q0409	5327001	TRANSISTOR 2SC458CD
Q0410	5328793	TRANSISTOR DTC144K-26
Q0411	5327021	TRANSISTOR 2SA844CD
Q0412	5328972	TRANSISTOR 2SC2412K-BRT
Q0413	5328972	TRANSISTOR 2SC2412K-BRT
Q0701	1323081	TRANSISTOR 2SA1036K(HQ)
Q0702	5328972	TRANSISTOR 2SC2412K-BRT[3]
Q0851	CF10622	TRANSISTOR FS3KM-10TO-220
Q0852	CF10451R	TRANSISTOR 2SC3246
Q0853	1321341	TRANSISTOR 2SD1765
Q0854	5327131	TRANSISTOR 2SB562C[D]
Q0854	5327262	TRANSISTOR 2SB1326[1, 3]
Q0855	5328972	TRANSISTOR 2SC2412K-BRT
Q0858	5327131	TRANSISTOR 2SB562C
Q0859	5327063	TRANSISTOR 2SC1740S
Q0864	1321341	TRANSISTOR 2SD1765
Q0901	5327151	TRANSISTOR 2SA952
Q0902	5328793	TRANSISTOR DTC144K-26
Q0905	5328962	TRANSISTOR 2SA1037K
Q0906	5328962	TRANSISTOR 2SA1037K
Q0911	5328962	TRANSISTOR 2SA1037K
Q0912	5328793	TRANSISTOR DTC144K-26
Q0913	5328972	TRANSISTOR 2SC2412K-BRT
Q0914	5328793	TRANSISTOR DTC144K-26
Q1101	5328972	TRANSISTOR 2SC2412K-BRT
Q1102	5328962	TRANSISTOR 2SA1037K
Q1401	5328972	TRANSISTOR 2SC2412K-BRT
Q1404	5328962	TRANSISTOR 2SA1037K
Q1407	5328962	TRANSISTOR 2SA1037K
Q1409	5328972	TRANSISTOR 2SC2412K-BRT
Q1410	5328962	TRANSISTOR 2SA1037K
Q1411	5328972	TRANSISTOR 2SC2412K-BRT
Q1701	5327071	TRANSISTOR DTC124ES
Q1702	5327071	TRANSISTOR DTC124ES
Q1802	5328793	TRANSISTOR DTC144K-26
Q2101	CF10372	TRANSISTOR PT493FL1
Q2102	CF10372	TRANSISTOR PT493FL1
Q2103	5328793	TRANSISTOR DTC144K-26
Q2104	5328793	TRANSISTOR DTC144K-26
Q2501	5328972	TRANSISTOR 2SC2412K-BRT
Q2502	5328972	TRANSISTOR 2SC2412K-BRT
Q2503	5328972	TRANSISTOR 2SC2412K-BRT
Q2504	5328793	TRANSISTOR DTC144K-26
Q2505	5328972	TRANSISTOR 2SC2412K-BRT
Q2506	5328793	TRANSISTOR DTC144K-26
Q2509	5327074	TRANSISTOR DTA144ES-T
Q2901	5328972	TRANSISTOR 2SC2412K-BRT[1, 3]
ZD0851	5339251	DIODE HZS2-C3
ZD0861	5336811	DIODE MA2180A
ZD0862	5339268	DIODE HZS11B2
ZD0864	5339482	DIODE HZS15-2
ZD0901	5339275	DIODE HZS7-B2
ZD0903	5339297	DIODE HZS5C3
ZD0904	5339297	DIODE HZS5C3
ZD2501	5339288	DIODE HZS30-3
ZD2502	5339296	DIODE HZS5B2

TRANSFORMERS

T0401	BT10251	TRANSFORMER, POWER
△T0851	5216914	TRANSFORMER, POWER

COILS

SYMBOL-NO	P-NO	DESCRIPTION
L0202	0770057	CHOKE COIL 100UH+-5%
L0203	5121288	COIL 15UH
L0204	5121287	COIL 10UH
L0205	0770057	CHOKE COIL 100UH+-5%
L0206	5121569	COIL 82UH
L0208	0770057	CHOKE COIL 100UH+-5%
L0209	5159142	CHOKE COIL 12UH
L0210	5159146	CHOKE COIL 27UH
L0401	5159114	COIL 15MH
L0403	0770057	CHOKE COIL 100UH+-5%
L0501	0770048	CHOKE COIL 22UH+-5%
L0502	0770057	CHOKE COIL 100UH+-5%
△L0851	BV10241	FILTER, LINE
L0853	BH00201R	COIL 10UH
L0854	BH00205R	COIL 22UH
L1101	0770057	CHOKE COIL 100UH+-5%
L1102	0770057	CHOKE COIL 100UH+-5%
L1103	0770057	CHOKE COIL 100UH+-5%
L1105	5121296	COIL 220UH
L1106	5121296	COIL 220UH
L1402	5121288	COIL 15UH
L1403	5121284	COIL 3.3UH
L1406	0770057	CHOKE COIL 100UH+-5%
L1701	0770057	CHOKE COIL 100UH+-5%
L1801	0770057	CHOKE COIL 100UH+-5%
L2502	0770061	CHOKE COIL 180 UH
L2504	0770057	CHOKE COIL 100UH+-5%
L2902	5121294	COIL 100UH[1, 3]
L2903	5121294	COIL 100UH[1, 3]

CRYSTALS

X0201	BP10531	CRYSTAL
X0901	BP10571	CRYSTAL
X0902	BP10251	CRYSTAL
X2901	BP10461	CRYSTAL[1, 3]

MISCELLANEOUS

BL0851	5272378	LC FILTER
BL0853	5272378	LC FILTER
BL0901	5272379	CORE, FERRITE
BL0902	5274521	CORE, FERRITE
△F0851	FN10201	FUSE 3A
FE2501	5582216	TUNER IF UNIT
△FH0851	5722412	HOLDER, FUSE
△FH0852	5722412	HOLDER, FUSE
JK2501	ES10343	JACK
JK2503	ES10372	JACK[0, 1]
JK2503	ES10373	JACK[3]
LCD1701	DB10341	FLOURESENT DISPLAY
LMP1701	5763358	BACK, LIGHT (HEPM)[1, 3]
LMP1702	5763358	BACK, LIGHT (HEPM)[1, 3]
LMP1703	5763358	BACK, LIGHT (HEPM)[1, 3]
△QF0851	5721945	IC PROTECTOR, ICP-N38
△QF0852	5721946	PROTECTOR, ICP-N15
S0701	FE10141R	SWITCH[0, 1]
S0702	FE10141R	SWITCH[0, 1]
S0703	FE10141R	SWITCH[0, 1]
S0704	FE10141R	SWITCH[0, 1]
S0705	FE10141R	SWITCH[0, 1]
S0706	FE10141R	SWITCH[0, 1]
S0707	FE10141R	SWITCH[0, 1]
S0708	5636101	SWITCH
S1701	5634884	SWITCH

SYMBOL-NO	P-NO	DESCRIPTION
S2101	FD10211	SWITCH, MODE
S2102	5635631	SWITCH
S2103	5635631	SWITCH
S2701	FH10271	SWITCH[3]
S2702	5634884	SWITCH[3]
S2703	5634884	SWITCH[3]
S2704	5634884	SWITCH[3]
S2705	5634884	SWITCH[3]
S2706	5634884	SWITCH[3]

CHAPTER 6 SCHEMATIC AND CIRCUIT BOARD DIAGRAMS

Applied Models: VT-FX610A
VT-FX611A
VT-FX613A

Cautions when using schematic diagrams

Caution for safety
The parts marked ⚠ are critical for safety. Be sure to use the specified parts to ensure safety when replacing them.

1. Values in schematic diagrams
The values, dielectric strength (power capacitance) and tolerances of the resistors (excluding variable resistors) and capacitors are indicated in the schematic diagrams using abbreviations.

[Resistors]

Item	Indication
Value	No indication ····· Ω K ····· kΩ M ····· MΩ
Tolerance	No indication ····· ±5% (All tolerances other than ±5% are indicated in the schematic diagrams)
Power capacitance	No indication ····· 1/8W (1/16W for leadless resistors without indication) All capacitances other than the above are indicated in the schematic diagrams.

[Capacitors]

Item	Indication
Value	No indication ····· μF P ····· pF
Dielectric strengh	No indication ····· 50V (All dielectric strengths other than 50V are indicated in the schematic diagrams.)

[Coils]

Item	Indication
Value	μ ····· μH m ····· mH

2. Markings in schematic diagrams
(1) Parts marked "■" with circuit numbers in the schematic diagrams are discrete parts.
(2) Parts marked "●" with circuit numbers in the schematic diagrams are leadless parts.

Cautions when using circuit board diagrams

1. Identifications of sides A/B in circuit board diagrams
(1) Board having a pattern on one side and parts on both sides.
Side A: Shows discrete parts, viewed from the pattern side.
Side B: Shows leadless parts, viewed from the pattern side.
(2) Board having patterns on both sides and parts on both sides.
Side A: Shows parts and patterns which can be seen when the case is opened.
Side B: Shows parts and the pattern on the back of side A.

2. Table for indexing locations of parts
This table shows locations of each part on the circuit board diagrams. The locations are indicated using the guide scales on the external lines of diagrams.

(1) In case of one-layer board

Symbol No.	Part Location
I C	← Sort of parts
IC201	2 A

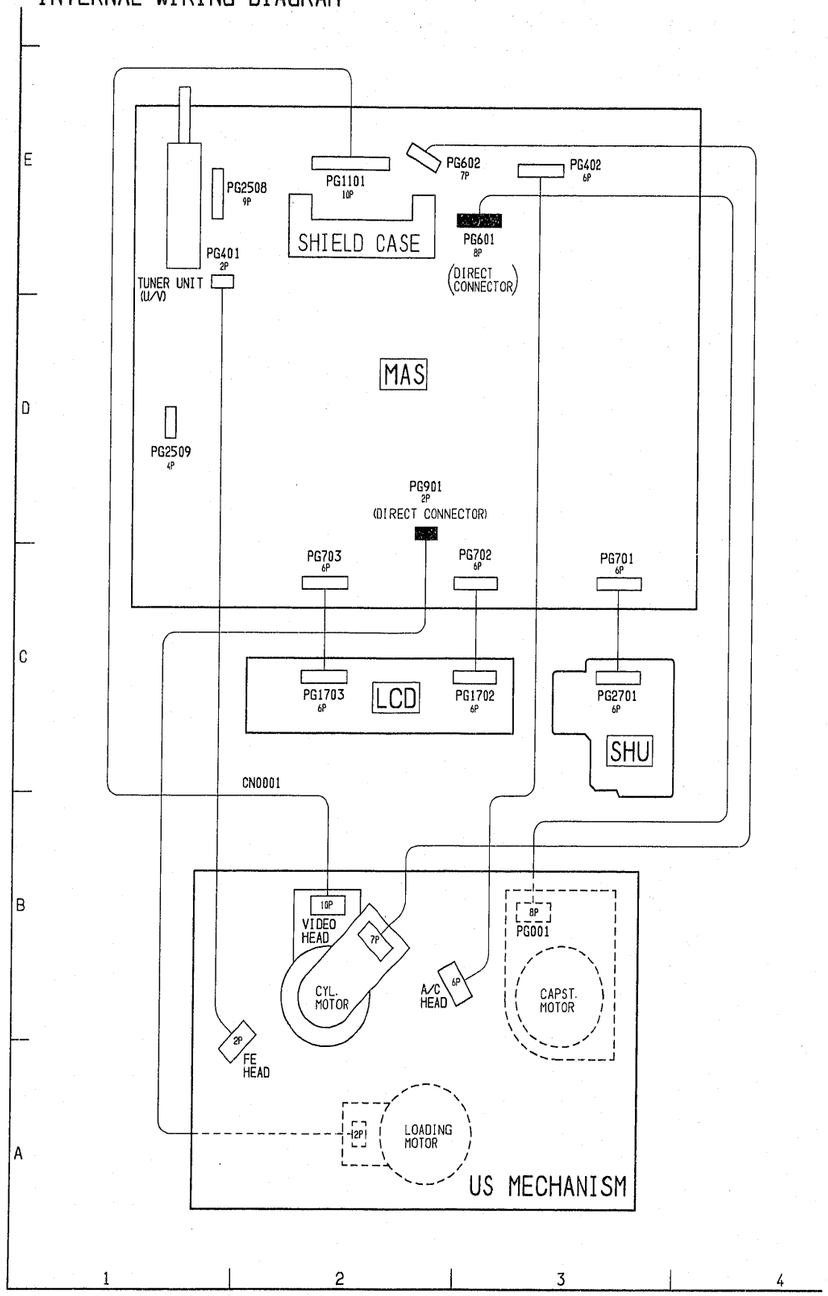
Circuit No.
Zone "A" on board diagram
Zone "2" on board diagram

(2) In case of side A/B indication board

Symbol No.	Part Location
Q	← Sort of parts
Q1201	A−2 A

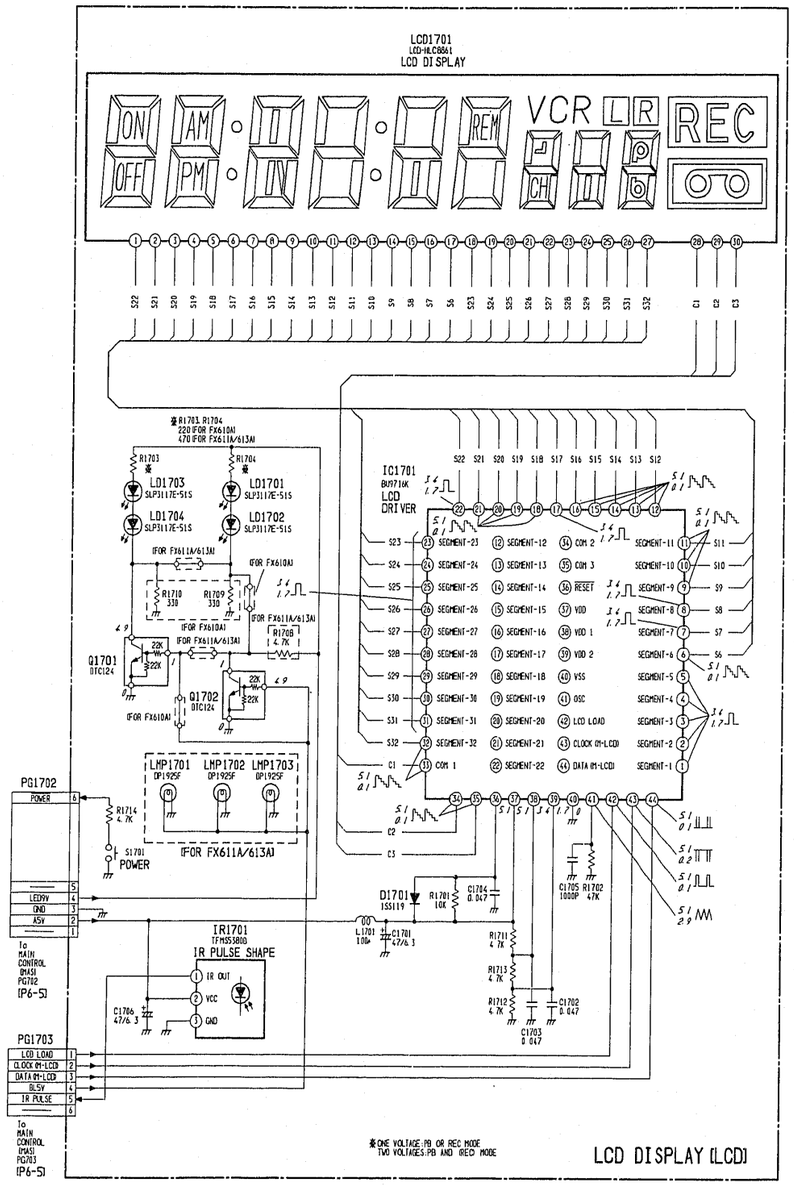
Circuit No.
Zone "A" on board diagram
Zone "2" on board diagram
A: Shows side A
B: Shows side B

INTERNAL WIRING DIAGRAM



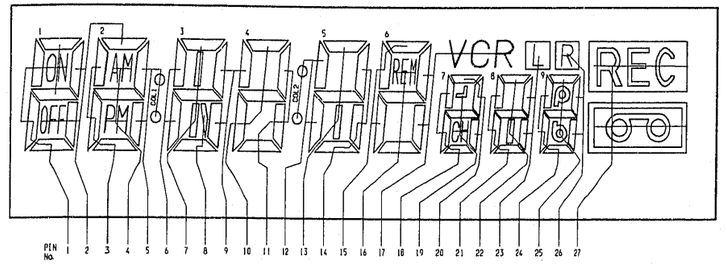
6-1 INTERNAL WIRING DIAGRAM

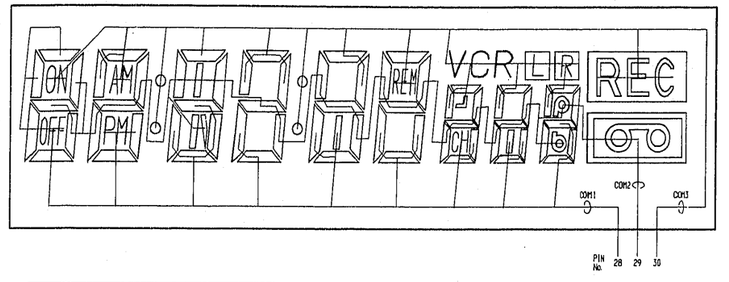
LCD DISPLAY (LCD) SCHEMATIC DIAGRAM



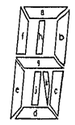
LCD DISPLAY (LCD)

LCD GRID TABLE

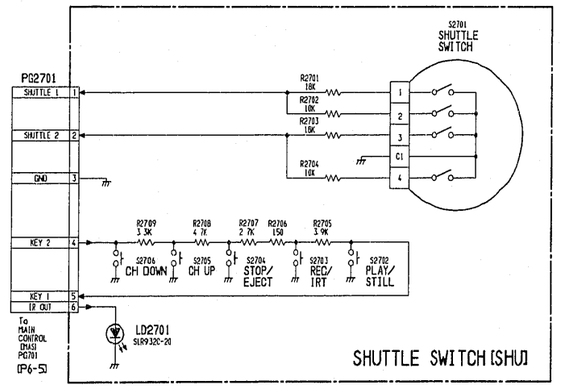




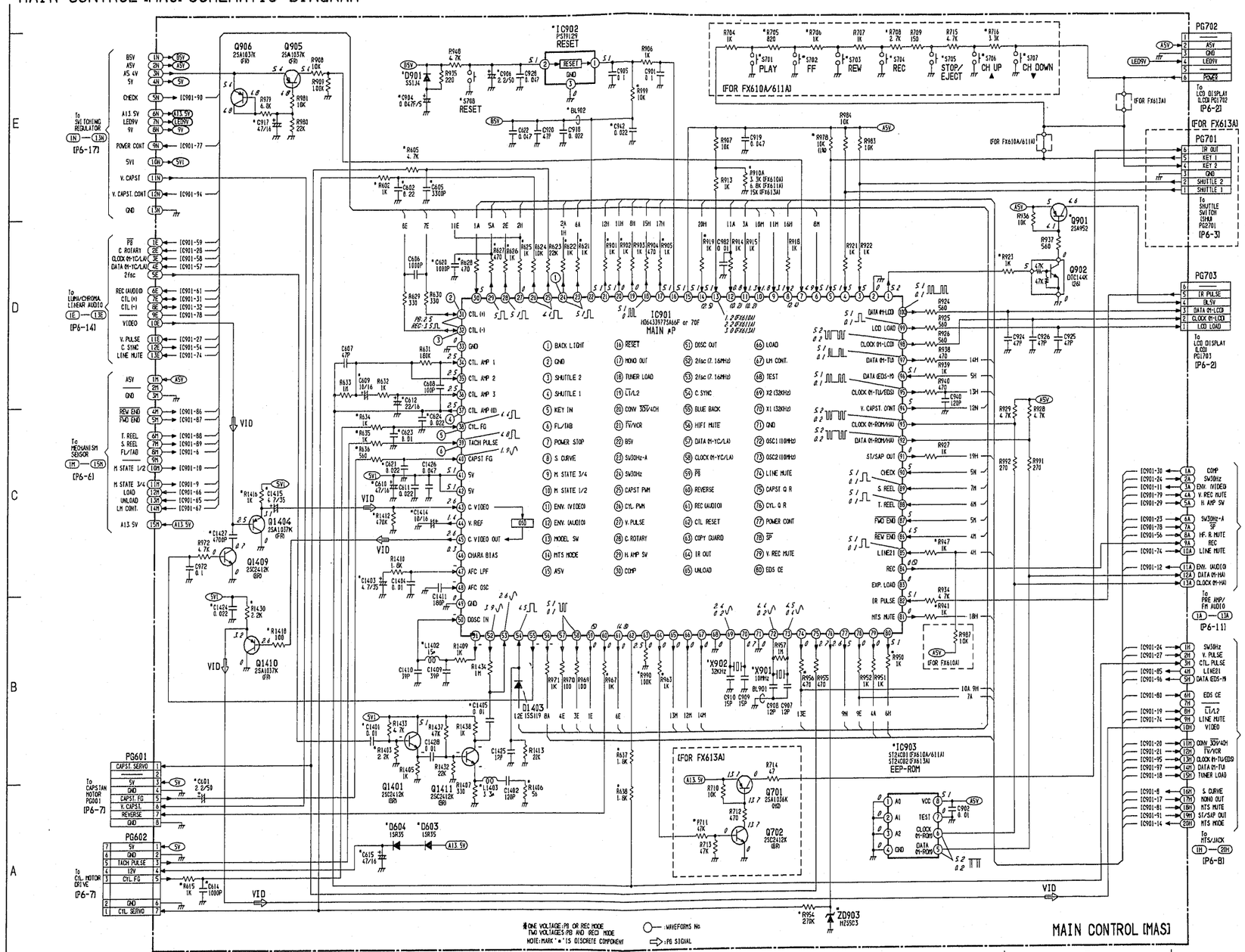
PIN No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
COM1	Inside	OFF	2d	PM	2c	3c	3g	3d	3c	4c	4d	5c	5j	5d	6c	6d	6c	7d	Ch	7c	8d	8j	8c	9d	9g	9c	—	COM	—	—
COM2	1g	1bc	2e	2g	2b	3f	3hJ	3k	3b	4g	4c	5f	5g	5c	6f	6g	6b	7e	7g	7b	8e	8g	8b	9e	D b	9b	PB	—	COM	—
COM3	ON	2a	2f	AM	COL1	—	3a	—	4f	4a	4b	COL2	5a	5b	6a	REM	VCR	7f	₫	7a	8f	8a	L	9f	9a	R	REC	—	—	COM



SHUTTLE SWITCH (SHU) SCHEMATIC DIAGRAM (FOR FX613A)



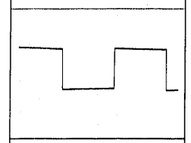
MAIN CONTROL [MAS] SCHEMATIC DIAGRAM



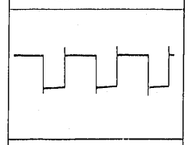
MAIN CONTROL 6-4 6-5 MAIN CONTROL

SERVO WAVEFORMS

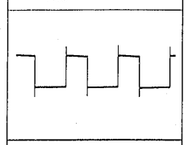
1-A IC901-24 5.6Vp-p
2V/5.0msec. cm
REC/PLAY



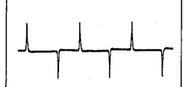
2-A IC901-31 5.7Vp-p
2V/10.0msec. cm
REC



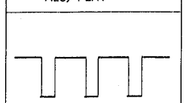
3-A IC901-32 5.7Vp-p
2V/10.0msec. cm
REC



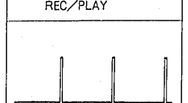
4-B IC901-37 3.2Vp-p
1V/10.0msec. cm
PLAY



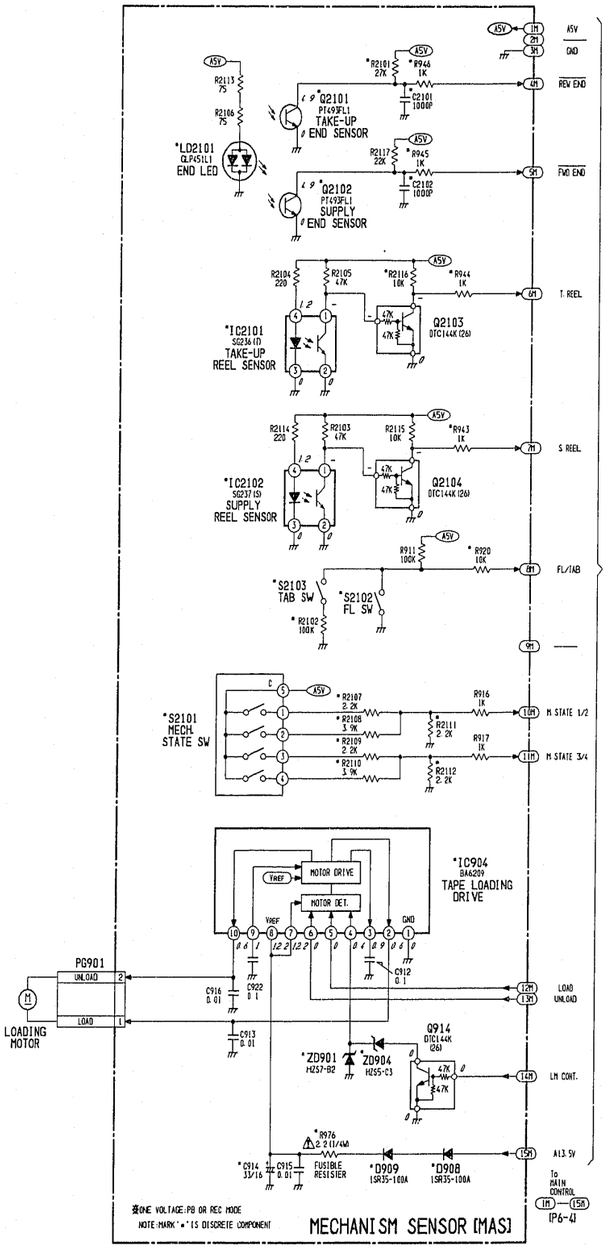
5-A IC901-38 4.6Vp-p
2V/500 μ sec. cm
REC/PLAY



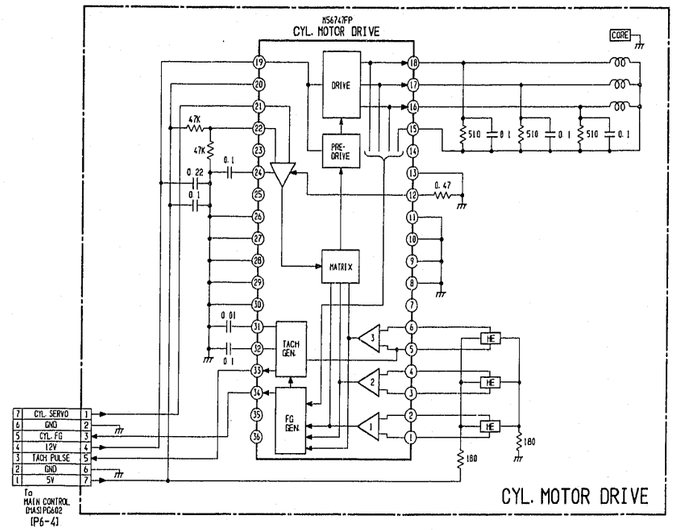
6-A IC901-39 4.8Vp-p
2V/10.0msec. cm
REC/PLAY



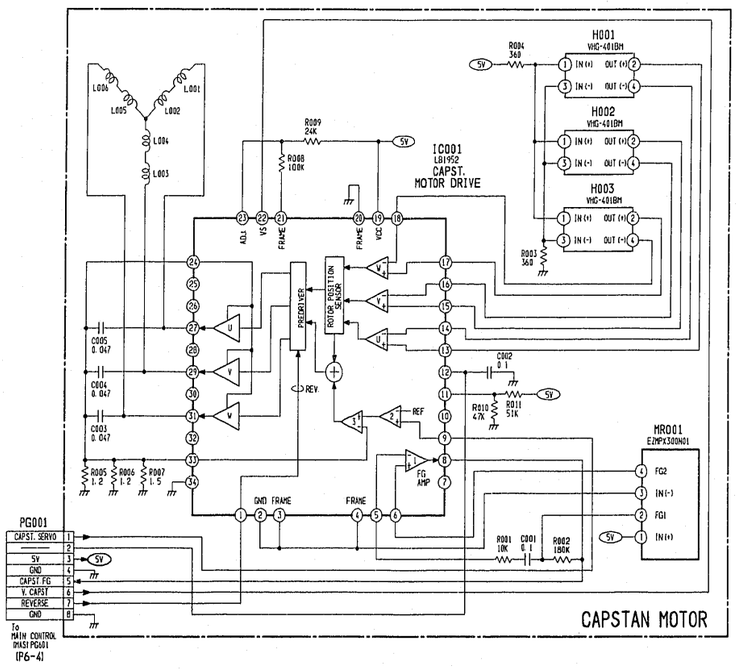
MECHANISM SENSOR [MAS] SCHEMATIC DIAGRAM



CYL. MOTOR DRIVE SCHEMATIC DIAGRAM

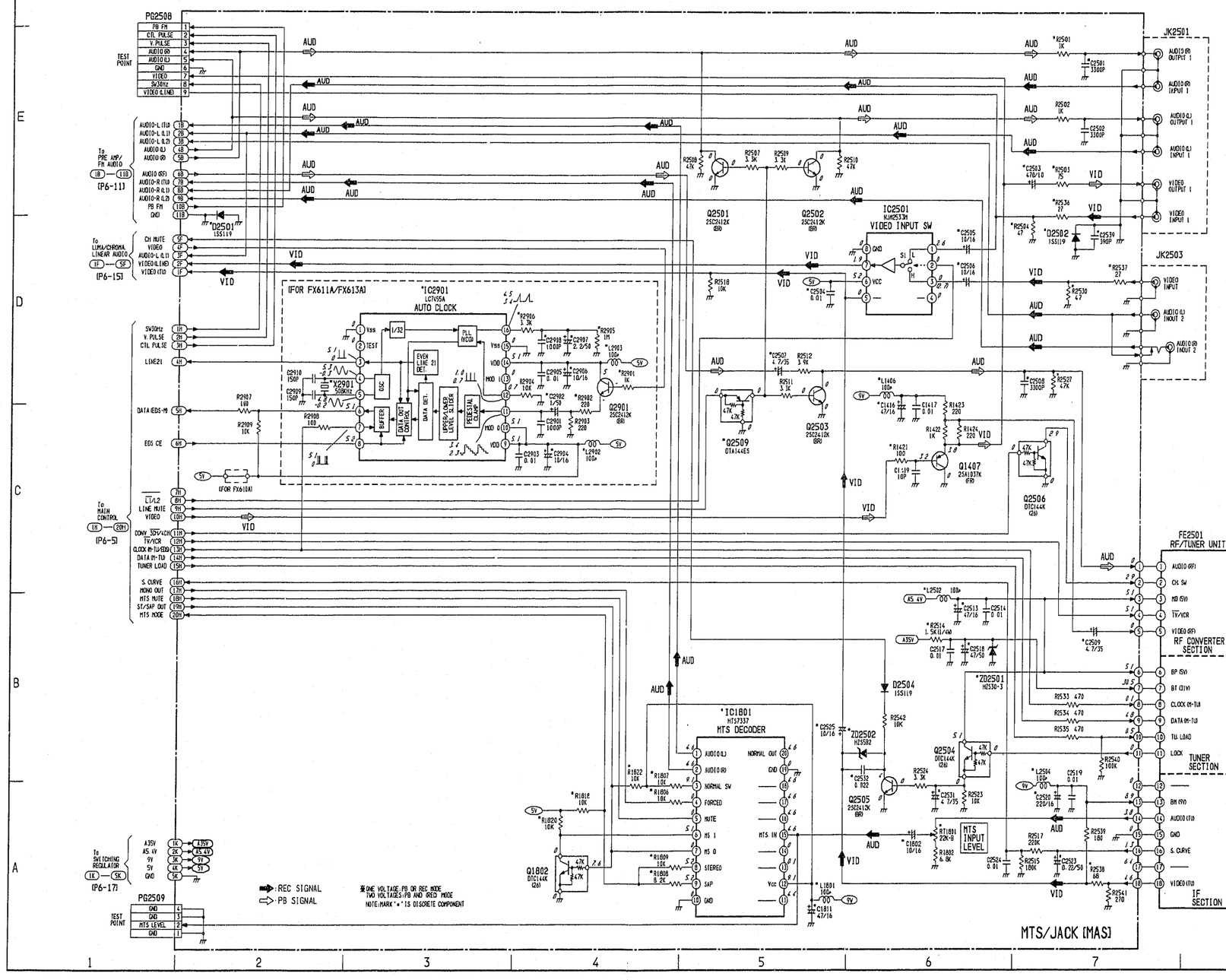


CAPSTAN MOTOR SCHEMATIC DIAGRAM



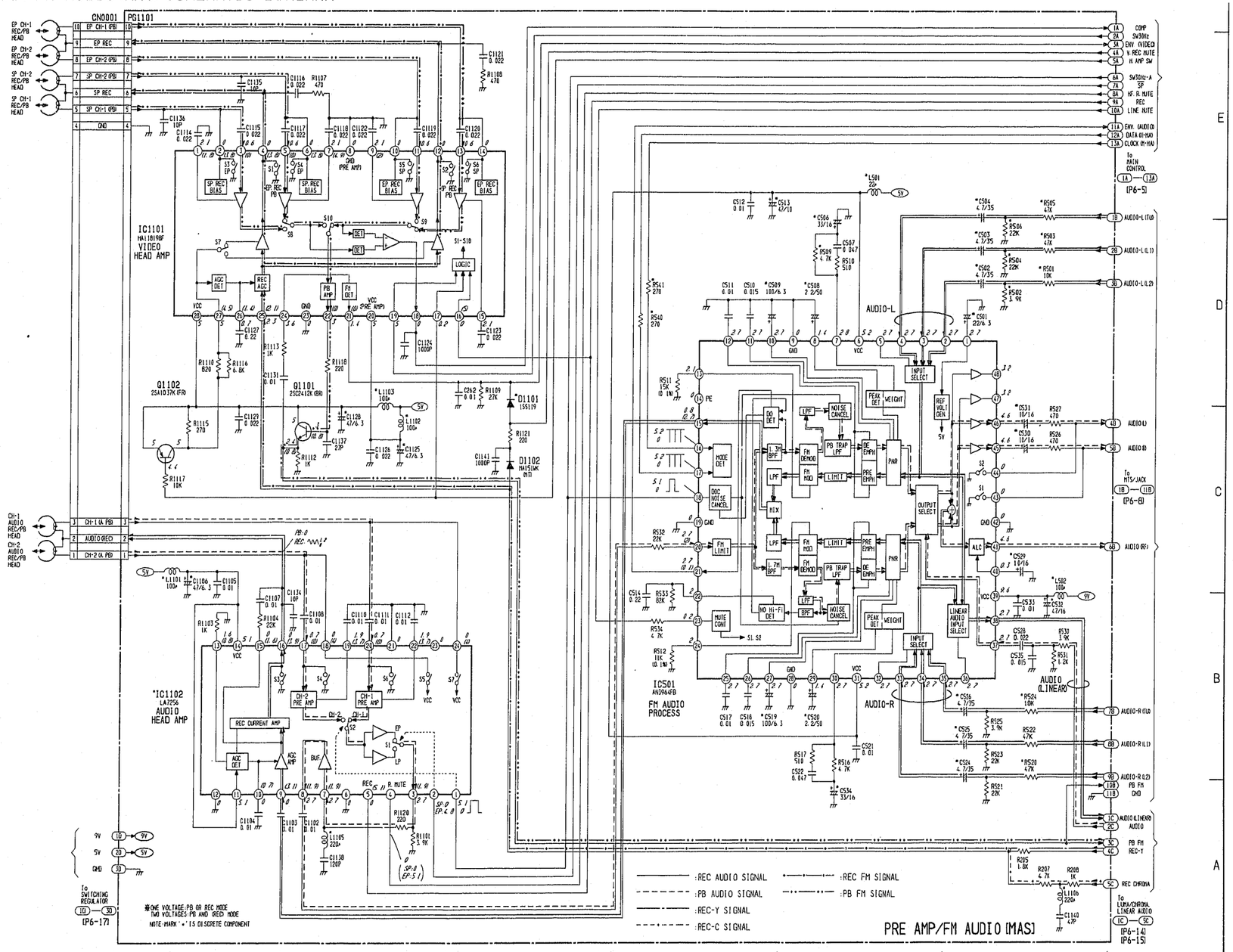
SERVO WAVEFORMS, MECHANISM SENSOR 6-6 6-7 CYL. MOTOR DRIVE, CAPSTAN MOTOR

MTS/JACK [MAS] SCHEMATIC DIAGRAM



MTS/JACK 6-8 6-9 MTS/JACK

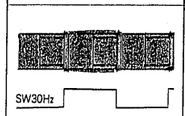
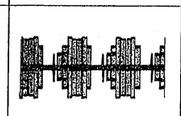
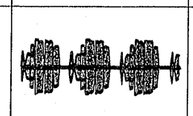
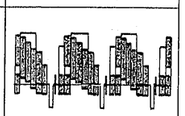
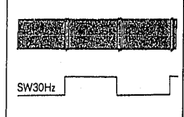
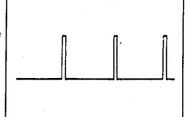
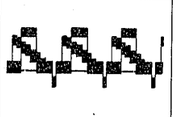
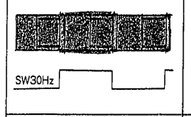
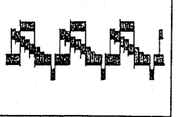
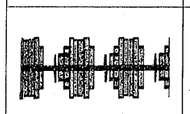
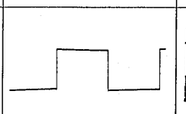
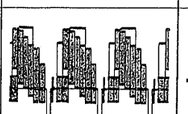
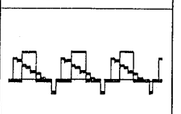
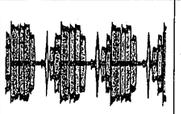
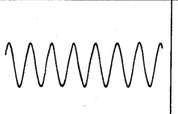
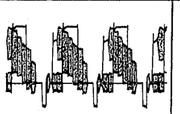
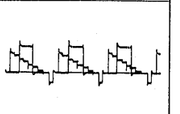
PRE AMP/FM AUDIO [MAS] SCHEMATIC DIAGRAM



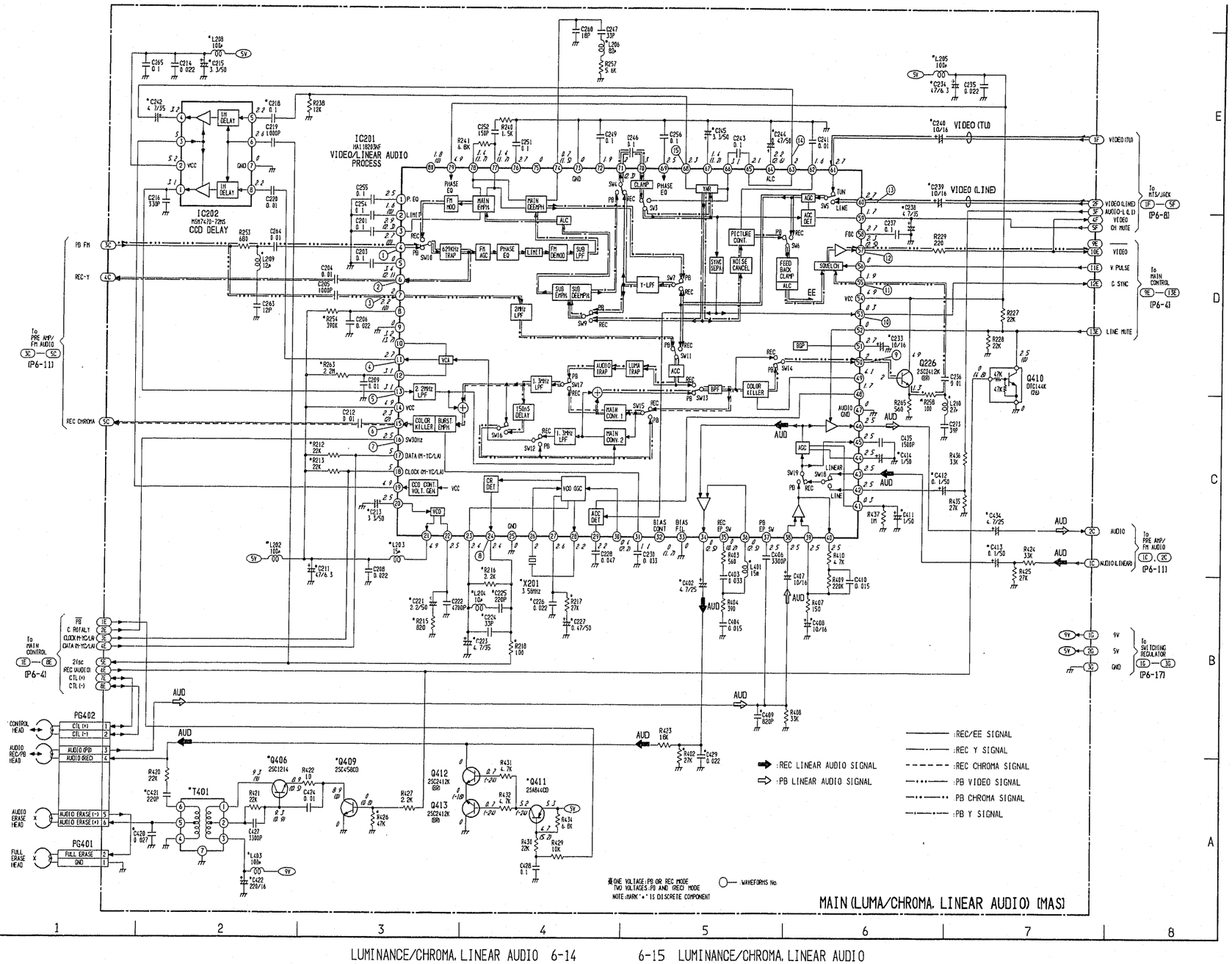
PRE AMP/FM AUDIO 6-10 6-11 PRE AMP/FM AUDIO

MEMO

LUMINANCE/CHROMA WAVEFORMS

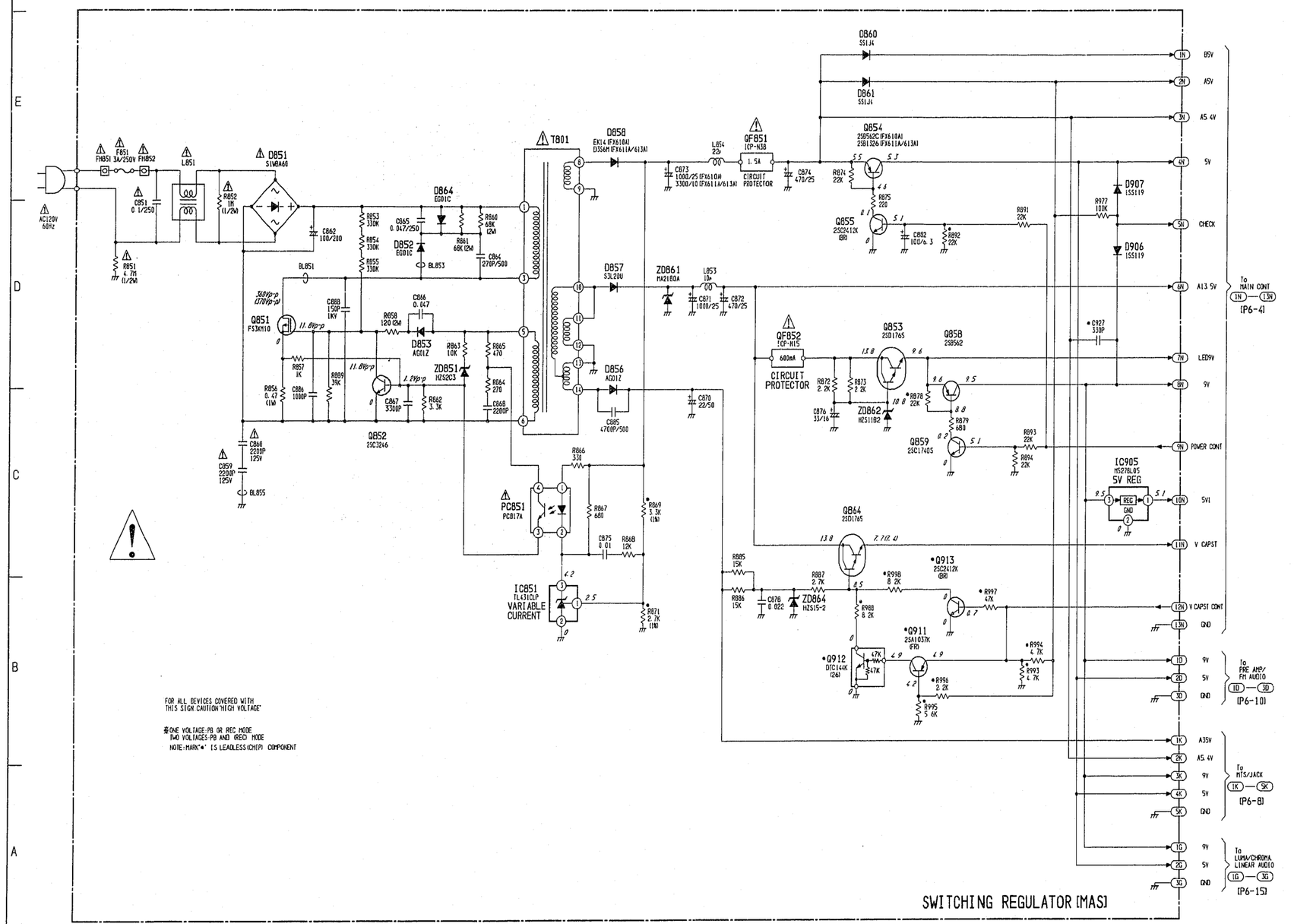
1-B IC201-4 550mVp-p 0.2V/5.0msec. cm PLAY	5-A IC201-13 530mVp-p 0.2V/20.0 μ sec. cm REC	9-B IC201-50 540mVp-p 0.2V/20.0 μ sec. cm PLAY	13-A IC201-60 1.4Vp-p 0.5V/20.0 μ sec. cm REC
			
2-A IC201-6 380mVp-p 0.2V/5.0msec. cm REC	5-B IC201-13 640mVp-p 0.2V/20.0 μ sec. cm PLAY	10-A IC201-53 5.0Vp-p 2V/20.0 μ sec. cm REC/PLAY	14-A IC201-63 680mVp-p 0.2V/20.0 μ sec. cm REC
			
3-B IC201-7 650mVp-p 0.2V/5.0msec. cm PLAY	6-A IC201-15 400mVp-p 0.1V/20.0 μ sec. cm REC	11-B IC201-55 500mVp-p 0.1V/20.0 μ sec. cm PLAY	14-B IC201-63 680mVp-p 0.2V/20.0 μ sec. cm PLAY
			
4-A IC201-11 330mVp-p 0.1V/20.0 μ sec. cm REC	7-A IC201-16 5.7Vp-p 2V/5.0msec. cm REC/PLAY	12-A IC201-57 2.1Vp-p 0.5V/20.0 μ sec. cm REC	15-A IC201-68 430mVp-p 0.2V/20.0 μ sec. cm REC
			
4-B IC201-11 420mVp-p 0.1V/20.0 μ sec. cm PLAY	8-A IC201-24 510mVp-p 0.2V/100nsec. cm REC/PLAY	12-B IC201-57 2.2Vp-p 0.5V/20.0 μ sec. cm PLAY	15-B IC201-68 430mVp-p 0.2V/20.0 μ sec. cm PLAY
			

LUMINANCE/CHROMA, LINEAR AUDIO (MAS) SCHEMATIC DIAGRAM

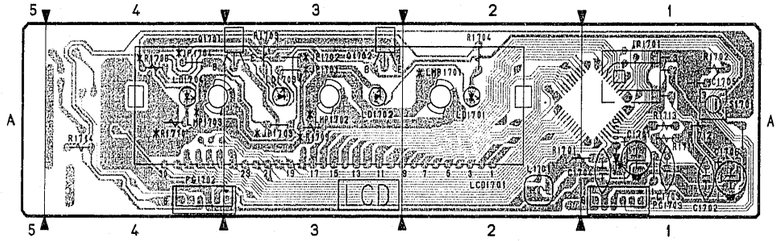


LUMINANCE/CHROMA, LINEAR AUDIO 6-14 6-15 LUMINANCE/CHROMA, LINEAR AUDIO

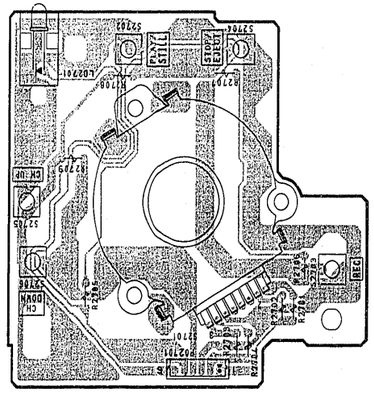
SWITCHING REGULATOR [MAS] SCHEMATIC DIAGRAM



LCD, SHU CIRCUIT BOARDS



LCD(LCD DISPLAY)
[PATTERN No.JK1165-4]



SHU(SHUTTLE SWITCH)
[PATTERN No.JK1166-4]
(For VT-FX613A)

IDENTIFICATION OF PARTS LOCATION

LCD [LCD DISPLAY]

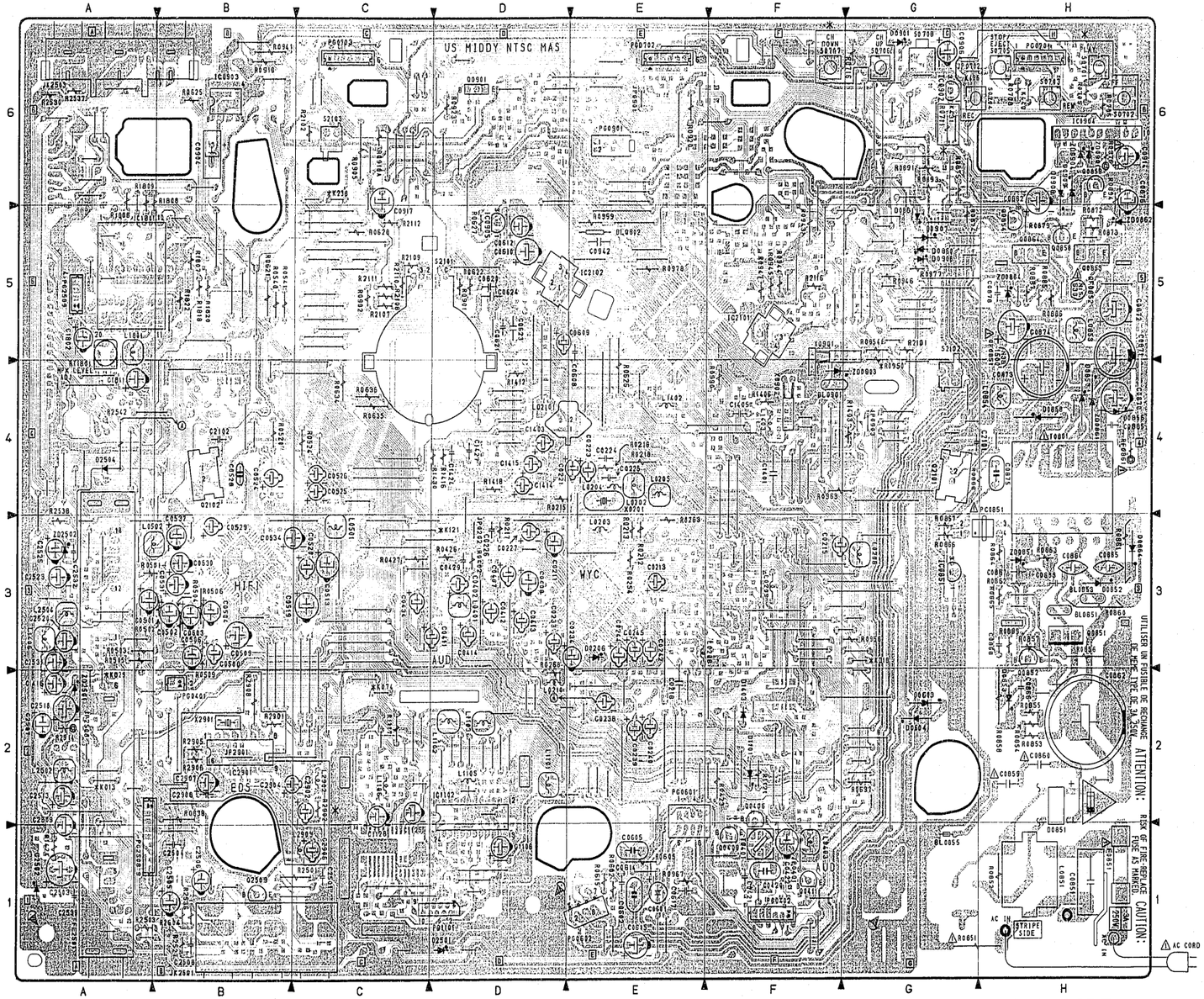
Symbol No.	Parts Location
C	
C1701	1A
C1702	1A
C1703	1A
C1704	1A
C1705	1A
C1706	1A
D	
D1701	1A
IC	
IC1701	1A
IR	
IR1701	1A
JP	
JP1701	3A
JP1702	3A
JP1703	4A
JP1704	4A
L	
L1701	2A
LCD	
LCD1701	2A
LD	
LD1701	2A
LD1702	3A
LD1703	3A
LD1704	4A
LMP	
LMP1701	2A
LMP1702	3A
LMP1703	4A
PG	
PG1702	4A
PG1703	1A
Q	
Q1701	3A
Q1702	3A
R	
R1701	2A
R1702	1A
R1703	3A
R1704	2A
R1708	4A
R1709	3A
R1710	4A
R1711	1A
R1712	1A
R1713	1A
R1714	4A
S	
S1701	1A

DIFFERENCE TABLE
LCD[LCD DISPLAY]

NOTE: This table listes the different components marked with asterisks(*) in the circuit board diagrams.

SYMBOL No.	FX610A	FX611A	FX613A
LMP1701	×	○	○
LMP1702	×	○	○
LMP1703	×	○	○
R1708	×	○	○
R1709	○	×	×
R1710	○	×	×
JP1701	×	○	○
JP1702	○	×	×
JP1703	○	×	×
JP1704	×	○	○

MAS CIRCUIT BOARD [SIDE A]



MAS(MAIN)-SIDE A-
[PATTERN No.JA1243-5]

DIFFERENCE TABLE
MAS[MAIN] – SIDE A –

NOTE: This table listes the different components marked with asterisks(＊) in the circuit board diagrams.

SYMBOL No.	FX610A	FX611A	FX613A
C2902	×	○	○
C2904	×	○	○
C2906	×	○	○
C2907	×	○	○
C2908	×	○	○
IC2901	×	○	○
JP702	×	×	○
JP2901	×	○	○
K013	×	○	○
K029	×	○	○
K431	×	○	○
K436	○	○	×
K440	×	×	○
L2902	JUMPER	100 μ	100 μ
L2903	×	○	○
PG701	×	×	○
R705	○	○	×
R706	○	○	×
R708	○	○	×
R711	×	×	○
R716	○	○	×
R2901	×	○	○
R2902	×	○	○
R2905	×	○	○
R2906	×	○	○
R2908	×	○	○
S701	○	○	×
S702	○	○	×
S703	○	○	×
S704	○	○	×
S705	○	○	×
S706	○	○	×
S707	○	○	×
X2901	×	○	○

IDENTIFICATION OF PARTS LOCATION

MAS [MAIN] 1/2

Symbol No.	Parts Location
BL	
BL0851	A-3H
BL0853	A-3H
BL0855	A-1G
BL0901	A-4F
BL0902	A-5E
C	
C0201	B-3F
C0203	B-3E
C0204	B-3F
C0205	B-3F
C0206	B-3E
C0208	B-3D
C0209	B-3F
C0211	A-3D
C0212	B-3F
C0213	A-3E
C0214	B-2F
C0215	A-3F
C0216	B-2F
C0218	A-2E
C0219	B-2F
C0220	B-3F
C0221	A-4E
C0222	B-4E
C0223	A-4E
C0224	A-4E
C0225	A-4E
C0226	A-3D
C0227	A-3D
C0228	B-3D
C0230	B-3D
C0233	A-3D
C0234	A-3E
C0235	B-3D
C0236	B-3E
C0237	B-2E
C0238	A-2E
C0239	A-2E
C0240	A-2E
C0241	B-2E
C0242	A-3E
C0243	B-3E
C0244	A-3E
C0245	A-3E
C0246	B-3E
C0247	B-3E
C0249	B-3E
C0251	B-3E
C0252	B-3E
C0254	B-3E
C0255	B-3E
C0256	B-3E
C0260	B-3E
C0262	B-2C
C0263	B-3F
C0264	B-3F
C0265	B-2F
C0273	B-2D
C0402	A-3D
C0403	B-3D
C0404	B-3D
C0406	B-3D
C0407	A-3D
C0408	A-3D
C0409	B-3D
C0410	B-3D
C0411	A-3D
C0412	A-3D
C0413	A-3D
C0414	A-3D
C0420	A-1F
C0421	A-1F
C0422	A-1F
C0424	B-2F
C0427	B-2F
C0428	B-1F
C0429	A-3D
C0434	A-3C
C0435	B-3D
C0501	A-3A
C0502	A-3B
C0503	A-3B
C0504	A-3B
C0506	A-3B
C0507	B-3B
C0508	A-3B
C0509	A-3B
C0510	B-3B
C0511	B-3B
C0512	B-3C
C0513	A-3C
C0514	B-3B
C0517	B-3B
C0518	B-3C
C0519	A-3C
C0520	A-3C
C0521	B-3C
C0522	B-3B
C0524	A-4B
C0525	A-4C
C0526	A-4C
C0528	A-4B
C0529	A-3B
C0530	A-3B
C0531	A-3B
C0532	A-3B
C0533	B-3B
C0534	A-3B
C0535	B-4B
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C0605	A-1E
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C0611	B-5D
C0612	A-5D
C0614	A-1E
C0615	A-1E
C0617	A-1E
C0620	A-5D
C0621	A-5D
C0622	B-5E
C0623	A-5D
C0624	A-5D
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C0862	A-2H
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C0870	A-4H
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C0878	A-5H
C0882	A-6H
C0885	A-4H
C0888	A-3H
C0901	B-5E
C0902	B-6B
C0904	A-6B
C0905	B-6G
C0906	A-6G
C0907	B-5F
C0908	B-5F
C0909	B-4F
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C2910	B-2B
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D0852	A-3H
D0853	A-2H
D0856	A-4H
D0857	A-4H
D0858	A-4H
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D0861	A-5G
D0864	A-3H
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D0908	A-6H
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Q1410	B-4D
Q1411	B-4F
Q1802	B-5B
Q2101	A-4G
Q2102	A-4B
Q2103	B-5F
Q2104	B-5D
Q2501	B-1C
Q2502	B-1B
Q2503	B-1B
Q2504	B-3A
Q2505	B-3A
Q2506	B-1A
Q2509	A-1B
Q2901	B-2C
QF	
QF0851	A-5H
QF0852	A-5H
R	
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S0703	A-6H
S0704	A-6G
S0705	A-6H
S0706	A-6G
S0707	A-6F
S0708	A-6G
S2101	A-5D
S2102	A-4G
S2103	A-6C
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T0801	A-4H
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X0901	A-5F
X0902	A-4F
X2901	A-2B
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ZB0026	B-5F
ZD	
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ZD0861	A-4H
ZD0862	A-5H
ZD0864	A-5H
ZD0901	A-6H
ZD0903	A-4G
ZD0904	A-6H
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ZD2502	A-3A

IDENTIFICATION OF PARTS LOCATION

MAS [MAIN] 1/2

Symbol No.	Parts Location
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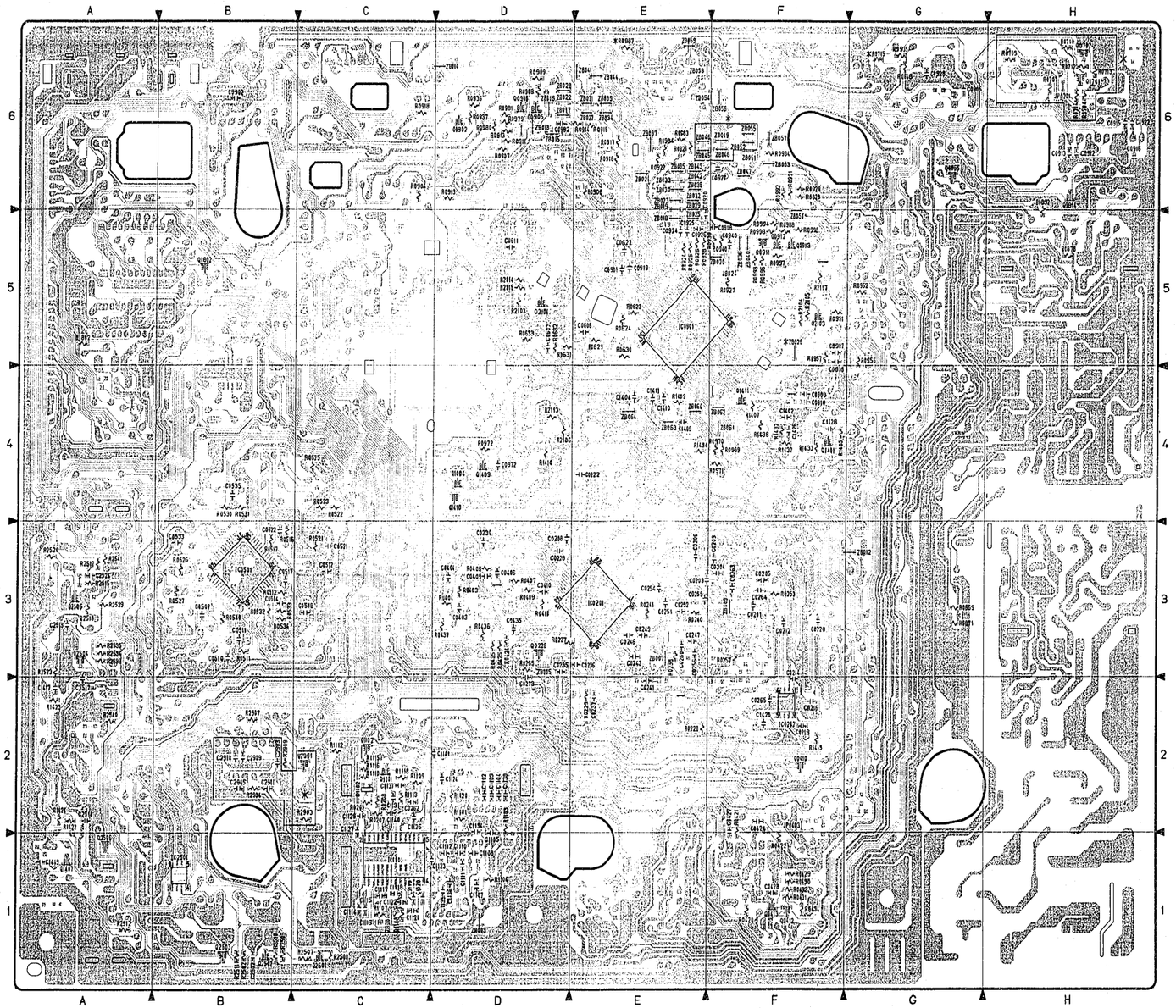
R0526	B-3B
R0527	B-3B
R0530	B-4B
R0531	B-4B
R0532	B-3B
R0533	B-3B
R0534	B-3B
R0540	A-5B
R0541	A-5B
R0602	A-1E
R0605	A-1E
R0615	A-1E
R0621	A-5B
R0622	A-5D
R0623	B-5E
R0624	B-5E
R0625	A-6B
R0626	A-4E
R0627	A-5D
R0628	A-5C
R0629	B-5E
R0630	B-5E
R0631	B-5D
R0632	B-5D
R0633	B-5D
R0634	A-4C
R0635	A-4C
R0636	A-4C
R0637	A-2G
R0638	A-2B
R0704	B-6H
R0705	A-6H
R0706	A-6H
R0707	B-6H
R0708	A-6H
R0709	B-6H
R0710	B-6H
R0711	A-6G
R0712	B-6H
R0713	B-6H
R0714	B-6H
R0715	B-6G
R0716	A-6G
R0851	A-1G
R0852	A-1H
R0853	A-2H
R0854	A-2H
R0855	A-2H
R0856	A-3H
R0857	A-3H
R0858	A-2H
R0860	A-3H
R0861	A-3H
R0862	A-3H
R0863	A-3H
R0864	A-3H
R0865	A-3H
R0866	A-3G
R0867	A-3G
R0868	A-4G
R0869	B-3G
R0871	B-3G
R0872	A-5H
R0873	A-5H
R0874	A-5G
R0875	A-6G
R0878	B-5H
R0879	A-5H
R0885	A-5H
R0886	A-5H
R0887	A-5H
R0889	A-3H
R0891	A-6G
R0892	B-6H
R0893	A-6G
R0894	A-6H
R0901	A-5D
R0902	A-5C
R0903	B-6D
R0904	B-6C
R0905	A-6C
R0906	B-6E
R0907	B-6D
R0908	B-6D
R0909	B-6D
R0910	A-6C
R0911	B-6D
R0913	B-6D
R0914	B-6E
R0915	B-6E
R0916	B-6E
R0917	B-6E
R0918	B-6C
R0919	A-6B
R0920	A-6E
R0921	B-6E
R0922	B-6E
R0923	A-6D
R0924	B-5E
R0925	B-5E
R0926	B-5E
R0927	B-5F
R0928	B-6F
R0929	B-6F
R0934	B-6F
R0935	B-6G
R0936	B-6D
R0937	B-6D
R0938	B-5E
R0939	B-5F
R0940	B-5F
R0941	A-6B
R0943	A-5F
R0944	A-5F
R0945	A-5F
R0946	A-5G
R0947	A-5F
R0948	B-6G
R0950	A-4G
R0951	B-5F
R0952	B-5G
R0954	A-5G
R0955	B-5G
R0956	A-3G
R0957	B-5F
R0963	A-4F
R0967	A-1E
R0969	B-4F
R0970	B-4F
R0971	B-4F
R0972	B-4D
R0976	A-6H
R0977	A-5G
R0978	A-5E
R0979	B-6D
R0980	B-6D
R0981	B-6D
R0983	B-6E
R0984	B-6E
R0987	B-6E
R0988	B-5F
R0990	A-4F
R0991	B-6F
R0992	B-6F
R0993	B-5F
R0994	B-5F
R0995	B-5F
R0996	B-5F
R0997	B-5F
R0998	B-5F
R0999	A-5E
R1101	B-2D
R1103	B-2D
R1104	B-1D
R1107	B-1C
R1108	B-1C
R1109	B-2C
R1110	B-2C
R1112	B-2C
R1113	B-2C
R1115	B-2C
R1116	B-2C
R1117	A-2C
R1118	B-2C
R1120	B-2D
R1121	A-2F
R1403	A-4G
R1405	B-4F
R1406	A-4F
R1407	B-4F
R1409	B-4E
R1410	B-4D
R1412	A-4D
R1413	B-2F
R1416	A-4D
R1418	A-4D
R1421	A-1A
R1422	B-2A
R1423	B-2A
R1424	B-2A
R1430	A-4D
R1432	B-4F
R1433	B-4F
R1434	B-4E
R1437	B-4F
R1438	B-4F
R1802	B-5A
R1806	A-5A
R1807	A-5B
R1808	B-6A
R1809	A-6A
R1818	A-5B
R1820	A-5B
R1822	A-5B
R2101	A-5G
R2102	A-6C
R2103	B-5D
R2104	B-5F
R2105	B-5F
R2106	B-4D
R2107	A-5C
R2108	A-5C
R2109	A-5C
R2110	A-5C
R2111	A-5C
R2112	A-5C
R2113	B-4D
R2114	B-5D
R2115	B-5D
R2116	A-5F
R2117	B-5F
R2501	A-1C
R2502	B-1B
R2503	A-1A
R2504	A-1B
R2507	B-1C
R2508	B-1C
R2509	B-1B
R2510	B-1B
R2511	B-1B
R2512	B-1A
R2514	A-2A
R2515	B-3A
R2517	B-3A
R2518	B-3A
R2523	B-3A
R2524	B-3A
R2527	A-1B
R2530	A-6A
R2533	B-3A
R2534	B-3A
R2535	B-3A
R2536	A-1B
R2537	A-6A
R2538	A-3A
R2539	B-3A
R2540	B-2A
R2541	B-3A
R2542	A-4A
R2901	A-2B
R2902	A-2C
R2903	B-2C
R2904	B-2B
R2905	A-2B
R2906	A-2B
R2907	B-2B
R2908	A-2B
R2909	B-2B
RF	
RF0861	A-4H
RT	
RT1801	A-5A
S	
S0701	A-6H
S0702	A-6H
S0703	A-6H
S0704	A-6G
S0705	A-6H
S0706	A-6G
S0707	A-6F
S0708	A-6G
S2101	A-5D
S2102	A-4G
S2103	A-6C
T	
T0401	A-1F
T0801	A-4H
X	
X0201	A-4E
X0901	A-5F
X0902	A-4F
X2901	A-2B
ZB	
ZB0026	B-5F
ZD	
ZD0851	A-3H
ZD0861	A-4H
ZD0862	A-5H
ZD0864	A-5H
ZD0901	A-6H
ZD0903	A-4G
ZD0904	A-6H
ZD2501	A-2A
ZD2502	A-3A

DIFFERENCE TABLE
MAS[MAIN] – SIDE B –

NOTE: This table listes the different components marked with asterisks(＊) in the circuit board diagrams.

SYMBOL No.	FX610A	FX611A	FX613A
C2901	×	○	○
C2903	×	○	○
C2905	×	○	○
C2909	×	○	○
C2910	×	○	○
JP701	○	○	×
Q701	×	×	○
Q702	×	×	○
Q2901	×	○	○
R704	○	○	×
R707	○	○	×
R709	○	○	×
R710	×	×	○
R712	×	×	○
R713	×	×	○
R714	×	×	○
R715	○	○	×
R987	○	×	×
R2903	×	○	○
R2904	×	○	○
ZB026	×	○	○
ZB045	×	×	○
ZB046	×	×	○
ZB048	×	×	○
ZB049	×	×	○
ZB052	×	×	○
ZB055	×	×	○

MAS CIRCUIT BORAD [SIDE B]



MAS(MAIN)-SIDE B-
[PATTERN No.JA1243-5]

CHAPTER 7 TROUBLE DISPLAY, BLOCK DAIAGRAMS AND MICROPROCESSOR PIN FUNCTION TABLES

1. Trouble Display Function

This VCR has a function which displays mechanism malfunctions, etc. in the LCD display. Use this function to analyze the cause when the power is shut off due to a malfunction, etc. in the mechanism.
Two types of information are displayed, ① The operation mode when the malfunction has occurred, ② Malfunction Code No.

Procedure to display a malfunction

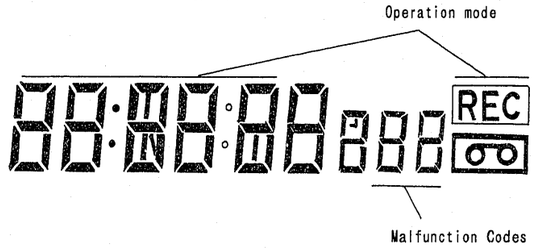
Press the "CHANNEL ▼" button on the VCR when the power is turned off and hold it; the malfunction code number is displayed while the button is held depressed.

Procedure to clear the malfuntion display

Press the "PLAY" button on the VCR and hold it, then press the microprocessor "RESET" button to initialize the trouble display.

The details of the malfunction are displayed as follows.

LCD DISPLAY



【Display of Details of Malfunction】

Displayed No.	Item	Details
"00"	No malfunction	
"01"	FL mechanism lock	Malfunction in insertion/ejection of cassette
"02"	Capstan lock	Malfunction of capstan motor drive during tape unloading
"04"	Reel lock	Reel rotation trouble when tape is running
"05"	Cylinder lock	Cylinder rotation malfunction
"07"	Loading mechanism lock	Malfunction in shifting mechanism mode
"16"	Servo lock	Shorting of 5V detected

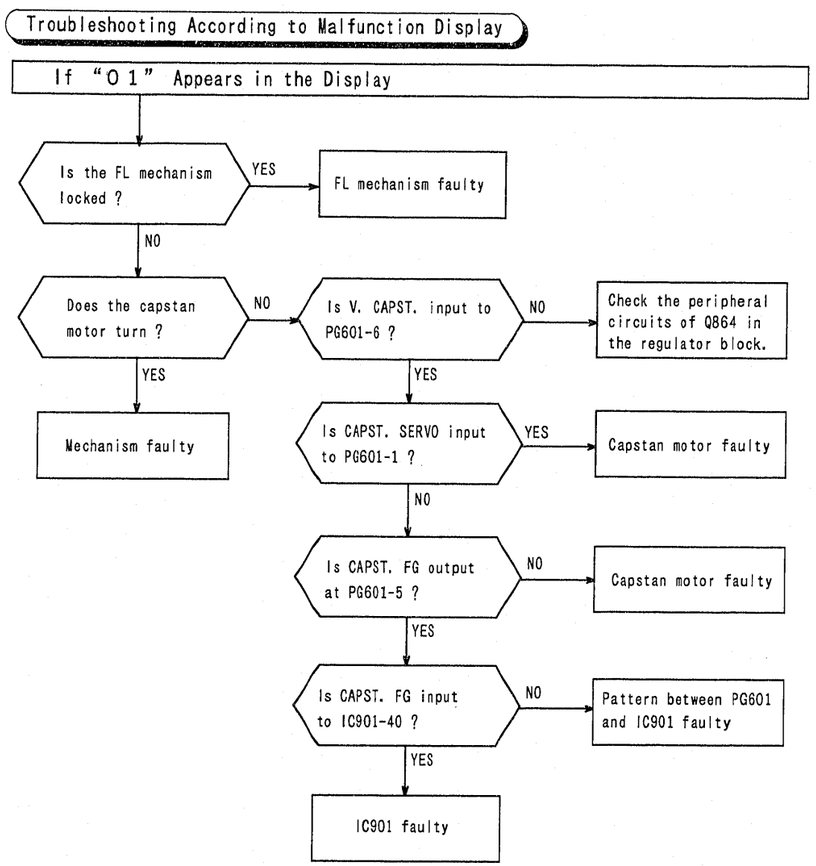
【Mode Display When Malfunction Has Occurred】

Mode	Display	Mode	Display
Stop	No display	Forward search	SRCH
Fast forward	FF	Reverse search	−SRCH
Rewind	REW	Slow motion play	SLOW
Recording	REC	Reverse motion slow play	−SLOW
Recording pause	REC (flashes)		
Playback	PLAY	Still motion play	STILL
Reverse playback	−PLAY		

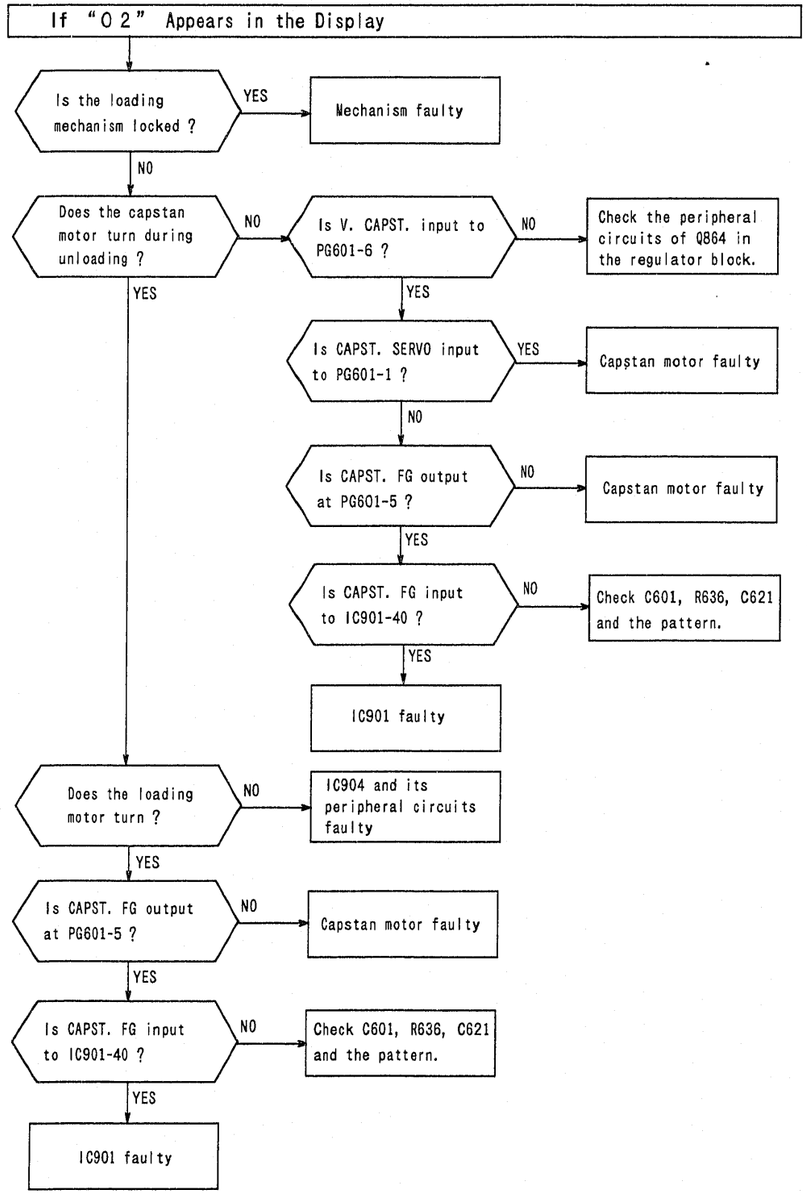
No symbols are displayed if the malfunction occurred when a cassette was inserted or ejected, or the power was switched on from off, and off from on.

Troubleshooting According to Malfunction Display

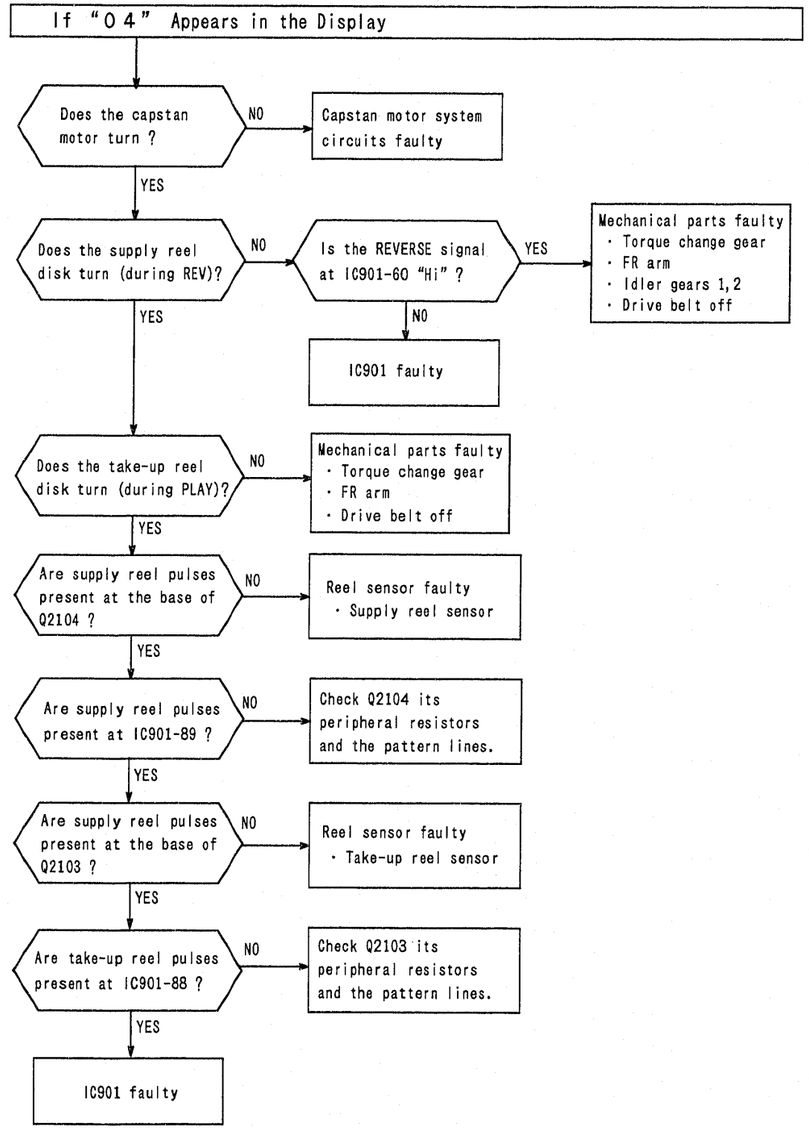
If "01" Appears in the Display



If "02" Appears in the Display

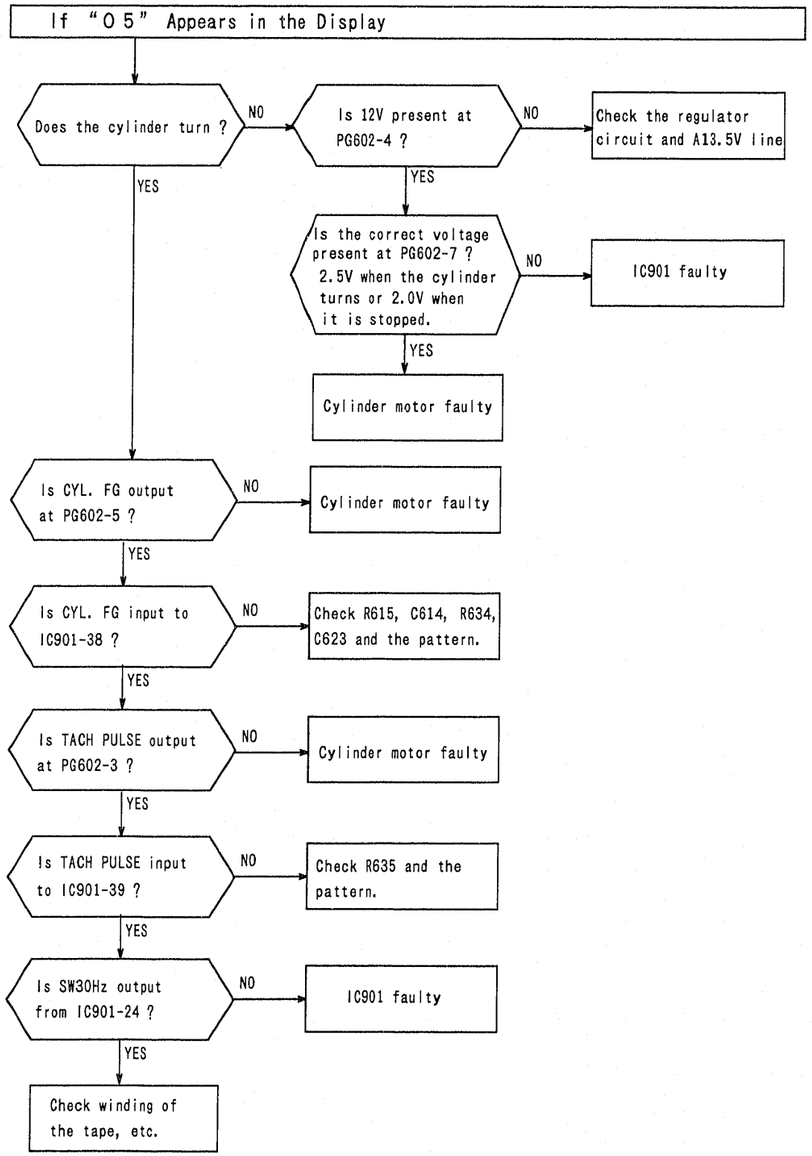


If "04" Appears in the Display

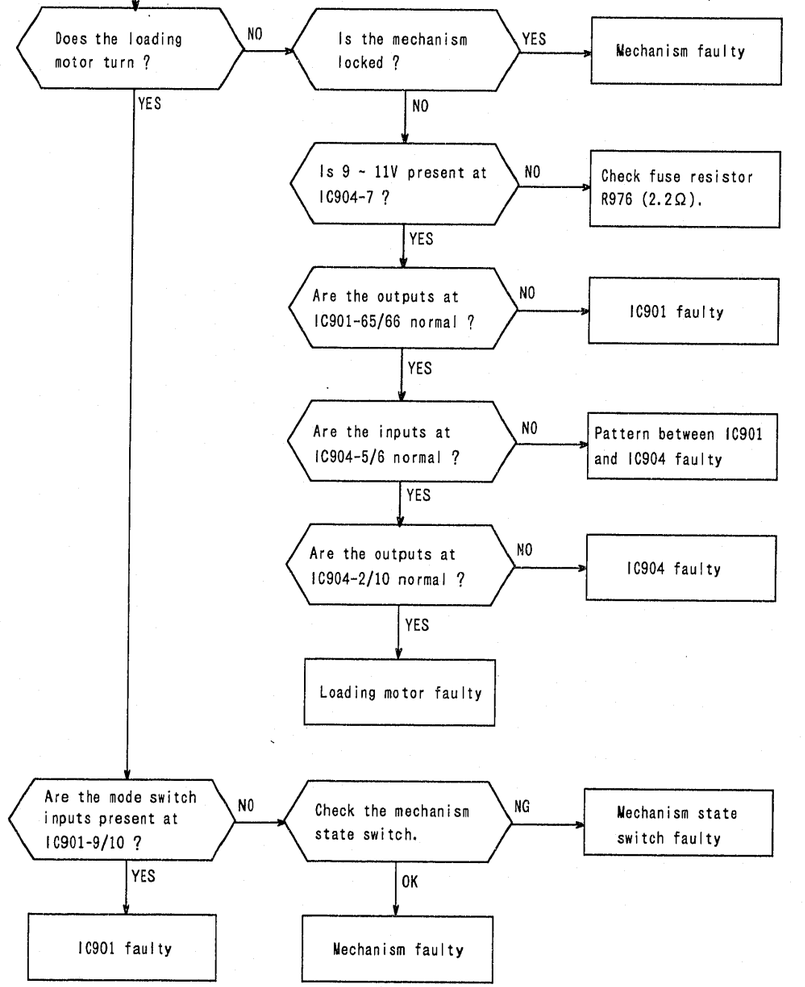


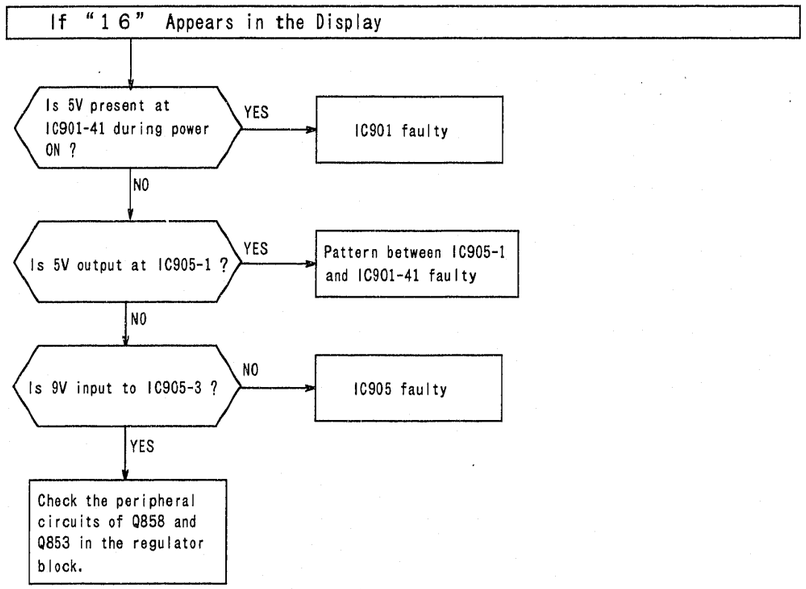
Note: The cylinder system has priority. If the cylinder motor is not driven normally, the capstan motor will not be driven.

If "05" Appears in the Display

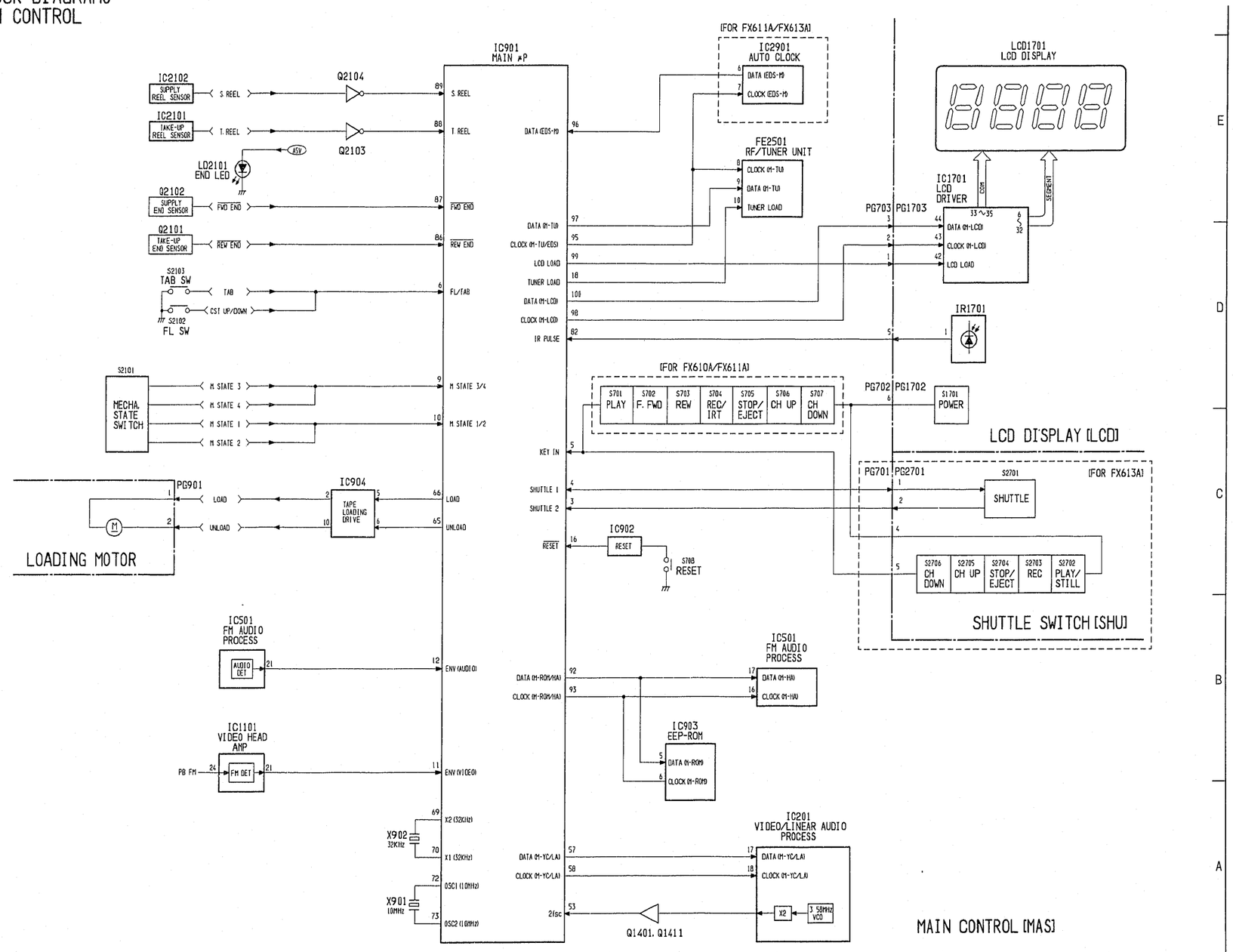


If "07" Appears in the Display

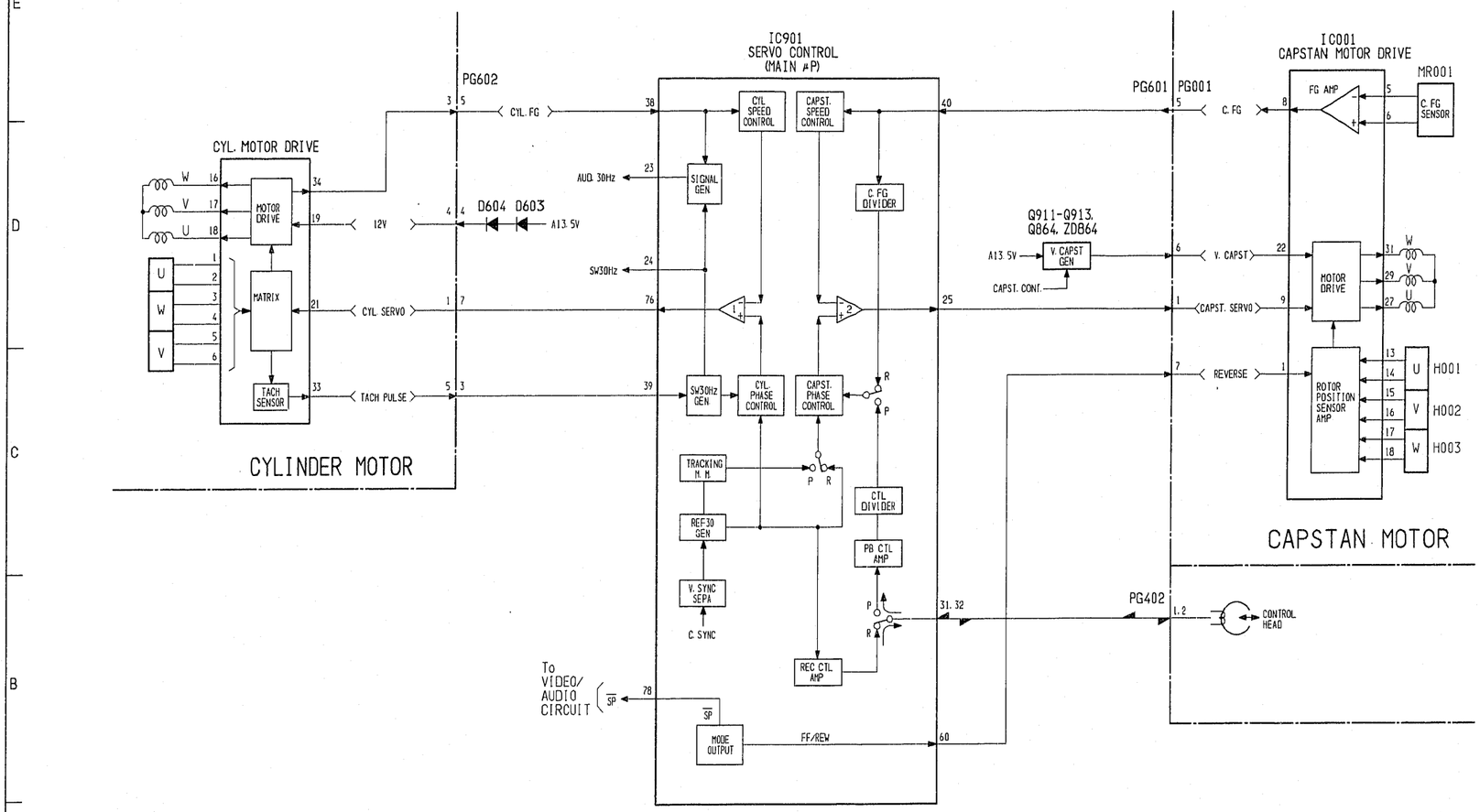



If "16" Appears in the Display
Is 5V present at IC901-41 during power ON ?
YES
IC901 faulty
NO
Is 5V output at IC905-1 ?
YES
Pattern between IC905-1 and IC901-41 faulty
NO
Is 9V input to IC905-3 ?
NO
IC905 faulty
YES
Check the peripheral circuits of Q858 and Q853 in the regulator block.

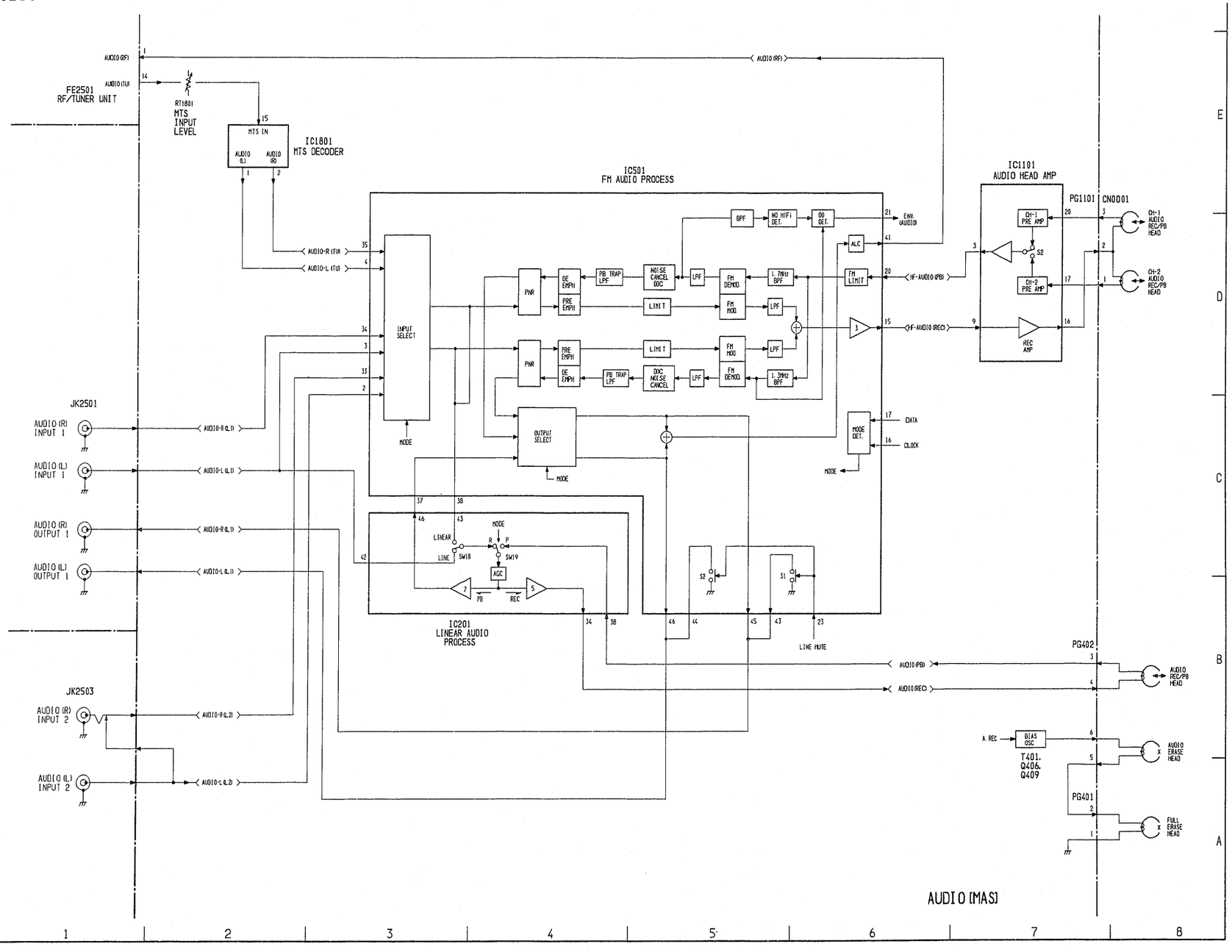
2. BLOCK DIAGRAMS
MAIN CONTROL



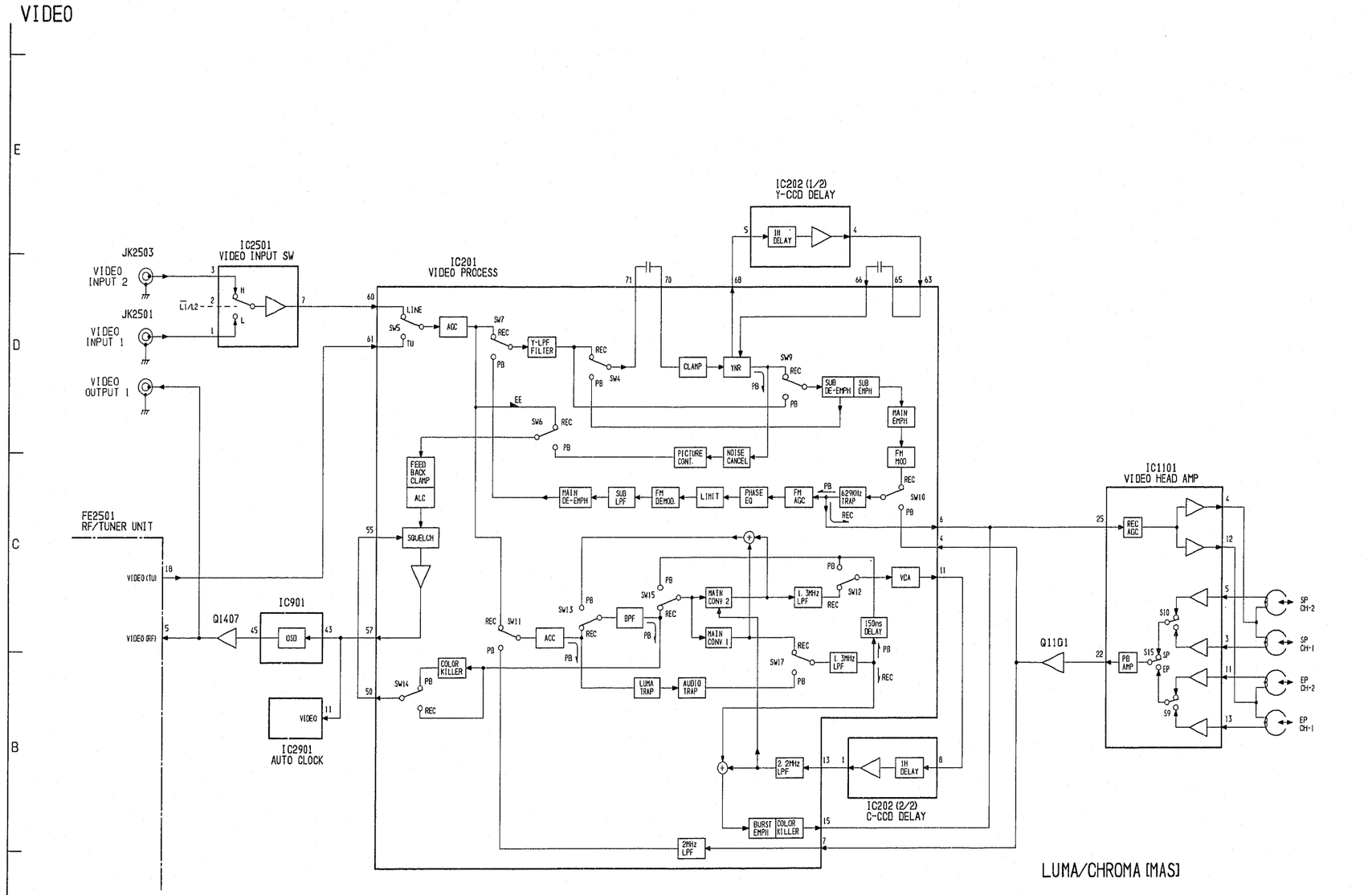
SERVO


IC901
SERVO CONTROL
(MAIN μP)
PG602
PG601
PG001
IC001
CAPSTAN MOTOR DRIVE
MR001
CYL. MOTOR DRIVE
CYL. FG
C. FG
FG AMP
C. FG SENSOR
CYL. SPEED CONTROL
CAPST. SPEED CONTROL
AUD. 30Hz
SIGNAL GEN
C. FG DIVIDER
D604 D603
A13.5V
12V
Q911-Q913.
Q864. ZD864
V. CAPST GEN
SW30Hz
CAPST. CONT.
V. CAPST
CYL. SERVO
CAPST. SERVO
MOTOR DRIVE
MATRIX
TACH SENSOR
TACH PULSE
REVERSE
ROTOR POSITION SENSOR AMP
H001
H002
H003
SW30Hz GEN
CYL. PHASE CONTROL
CAPST. PHASE CONTROL
TRACKING M. M.
REF30 GEN
V. SYNC SEPA
C SYNC
CTL DIVIDER
PB CTL AMP
REC CTL AMP
To VIDEO/ AUDIO CIRCUIT
SP
MODE OUTPUT
FF/REV
PG402
CONTROL HEAD
CYLINDER MOTOR
CAPSTAN MOTOR
SERVO [MAS]

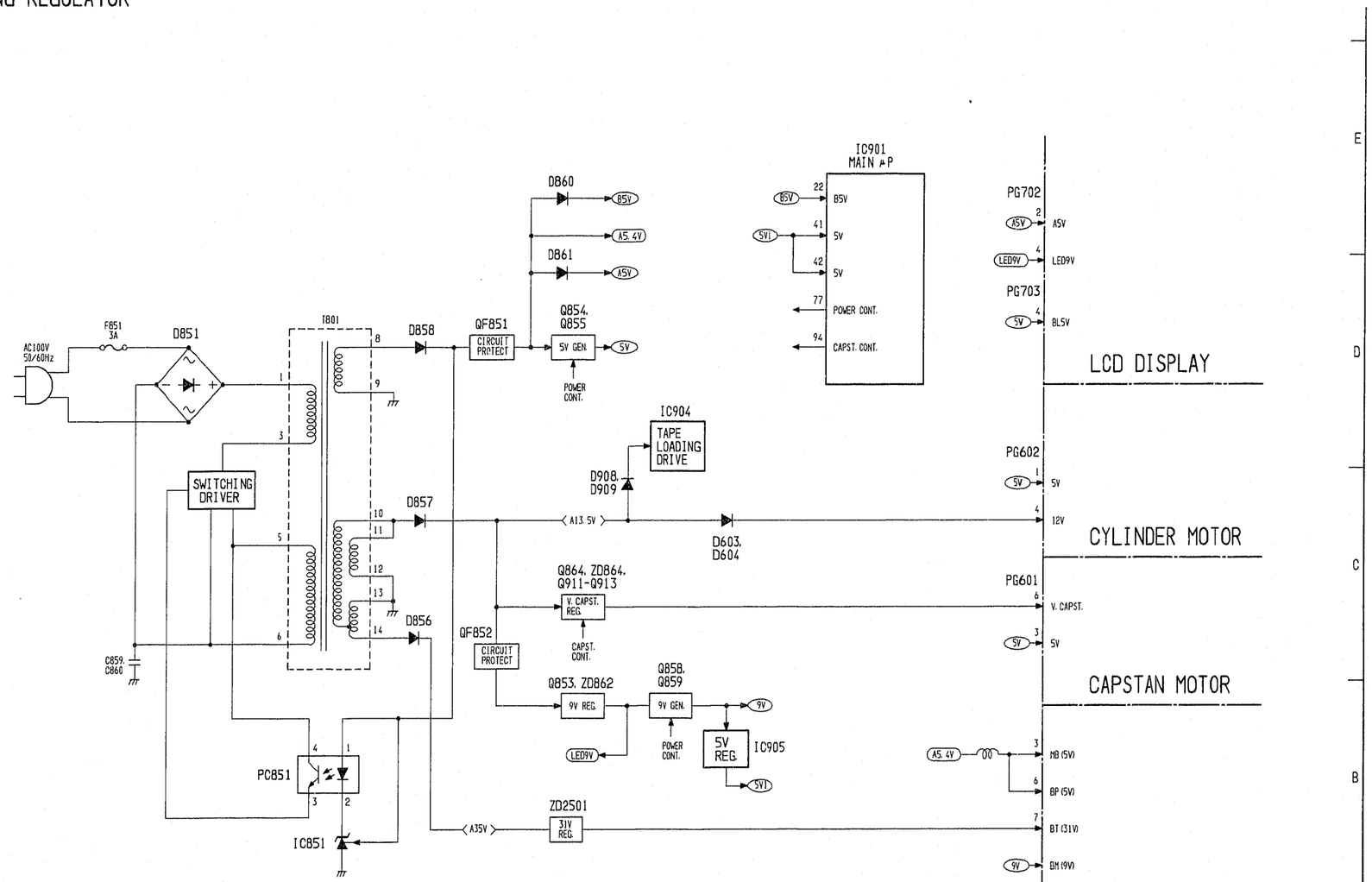
AUDIO


FE2501
RF/TUNER UNIT
AUDIO (RF)
AUDIO (TU)
RT1801
MTS INPUT LEVEL
IC1801
MTS DECODER
MTS IN
AUDIO (L)
AUDIO (R)
AUDIO-R (TU)
AUDIO-L (TU)
IC501
FM AUDIO PROCESS
INPUT SELECT
MODE
PNR
DE EMPH
PRE EMPH
PB TRAP LPF
NOISE CANCEL DOC
DOC NOISE CANCEL
LPF
FM DEMOD.
FM MOD.
LIMIT
BPF
NO MIFi DET.
DO DET.
ENV (AUDIO)
ALC
FM LIMIT
1.7MHz BPF
1.3MHz BPF
OUTPUT SELECT
MODE DET.
DATA
CLOCK
IF-AUDIO (PB)
IF-AUDIO (REC)
IC1101
AUDIO HEAD AMP
PG1101 CN0001
CH-1 PRE AMP
CH-2 PRE AMP
REC AMP
S2
CH-1 AUDIO REC/PB HEAD
CH-2 AUDIO REC/PB HEAD
JK2501
AUDIO (R) INPUT 1
AUDIO (L) INPUT 1
AUDIO (R) OUTPUT 1
AUDIO (L) OUTPUT 1
AUDIO-R (L1)
AUDIO-L (L1)
JK2503
AUDIO (R) INPUT 2
AUDIO (L) INPUT 2
AUDIO-R (L2)
AUDIO-L (L2)
LINEAR
LINE
SW18
SW19
AGC
PB
REC
S1
IC201
LINEAR AUDIO PROCESS
LINE MUTE
PG402
AUDIO (PB)
AUDIO (REC)
AUDIO REC/PB HEAD
A. REC
BIAS OSC
T401.
Q406.
Q409
AUDIO ERASE HEAD
PG401
FULL ERASE HEAD
AUDIO [MAS]

VIDEO


IC202 (1/2)
Y-CCD DELAY
1H DELAY
IC201
VIDEO PROCESS
JK2503
VIDEO INPUT 2
JK2501
VIDEO INPUT 1
VIDEO OUTPUT 1
IC2501
VIDEO INPUT SW
H
L
LINE
TU
SW5
ACC
SW7
REC
PB
Y-LPF FILTER
SW4
CLAMP
YNR
SW9
SUB DE-EMPH
SUB EMPH
MAIN EMPH
FM MOD
EE
SW6
PICTURE CONT.
NOISE CANCEL
FEED BACK CLAMP
ALC
SQUELCH
MAIN DE-EMPH
SUB LPF
FM DEMOD
LIMIT
PHASE EQ
FM AGC
629KHz TRAP
SW10
FE2501
RF/TUNER UNIT
VIDEO(TU)
VIDEO(RF)
Q1407
IC901
OSD
VIDEO
IC2901
AUTO CLOCK
SW13
SW11
BPF
SW15
MAIN CONV 2
MAIN CONV 1
1.3MHz LPF
SW12
150ns DELAY
SW17
COLOR KILLER
SW14
LUMA TRAP
AUDIO TRAP
VCA
2.2MHz LPF
BURST EMPH
2MHz LPF
IC202 (2/2)
C-CCD DELAY
IC1101
VIDEO HEAD AMP
REC AGC
PB AMP
Q1101
S10
S15
S9
SP
EP
SP CH-2
SP CH-1
EP CH-2
EP CH-1
LUMA/CHROMA [MAS]

SWITCHING REGULATOR



3. MICROPROCESSOR PIN FUNCTION TABLES

LCD DRIVER μP (IC1701)

Pin No.	I/O	Active Level	Abbreviation	Function
1	–	–	SEGMENT (1)	Not used.
2	–	–	SEGMENT (2)	
|	|	|	|	
5	–	–	SEGMENT (5)	
6	O	Pulse	SEGMENT (6)	LCD segment control outputs.
7	O	Pulse	SEGMENT (7)	
|	|	|	|	
31	O	Pulse	SEGMENT (31)	
32	O	Pulse	SEGMENT (32)	
33	O	Pulse	COM1	LCD common (COM) control outputs.
34	O	Pulse	COM2	
35	O	Pulse	COM3	
36	I	Lo	RESET (L)	Initializes the LCD-μP when power is supplied.
37	I	Hi	VDD	A5V power input.
38	I	–	VDD 1	LCD drive bias.
39	I	–	VDD 2	LCD drive bias.
40	–	Lo	VSS	Ground.
41	I/O	–	OSC	Generates a 32kHz signal for key scanning.
42	I	Lo	LCD LOAD	LOAD signal between the LCD-μP and M-μP. "Lo" input enables chip select.
43	I	Pulse	CLOCK (M-LCD)	The data is transferred from the M-μP, synchronized with the clock signal.
44	I	Pulse	DATA (M-LCD)	

MAIN μP (IC901)

Pin No.	I/O	Active Level	Abbreviation	Function
1	O	Hi	BACKLIGHT	LCD backlight switching signal.
2	–	–	GND	Ground.
3	I	A/D	SHUTTLE 2	Inputs from the shuttle dial switches. The shuttle speed and direction are determined.
4	I	A/D	SHUTTLE 1	
5	I	A/D	KEY IN	Key matrix input.
6	I	A/D	FL/TAB	Cassette position/erase prevention tab detection input. Hi: TAB SW OFF (with tab), Mid: TAB SW ON (without tab), Lo: When cassette is being inserted/ejected. When a cassette without its erase prevention tab is inserted, recording is inhibited, and when the timer is programmed, it is ejected automatically.
7	I	Lo	POWER STOP	When A5V voltage drops and "Lo" is input, the M-μP detects that a power failure has occurred.
8	I	Hi	S-CURVE	Detects the AFT (S-CURVE) signal from the IF unit to fine tune to a station.
9	I	A/D	M. STATE 3/4	The signals which detect the mechanism state are input to control the loading motor.
10	I	A/D	M. STATE 1/2	

Pin	EJECT	UNLOAD	REV.	R.SLOW	SLOW	R/P	STOP2	FF/REW
9	0	2.5	1.8	2.5	3.05	3.05	2.5	0
10	1.8	3.05	0	0	0	1.8	2.5	3.05

11	I	A/D	ENV. (VIDEO)	Audio and video envelope level inputs for autotracking.
12	I	A/D	ENV. (AUDIO)	
13	I	A/D	MODEL SW	Model switching control.
14	I	Hi/Mid/Lo	MPX MODE	Lo: Stereo signal input, Mid: Bilingual signal input, Hi: Mono signal input.
15	I	–	A5V	Connected to A5V.
16	I	Lo	RESET (L)	Initializes the M-uP when power is supplied.
17	O	Hi	MONO OUT	Output to control the MTS decoder output mode to mono.
18	O	Hi	TUNER LOAD	A data line is provided between the M-μP and U/V tuner and the μP sets the LOAD pin to "Hi" when transferring data and holds it until transfer is completed.
19	O	Lo/Hi	L1 (L) / L2	L1 / L2 switching control signal output.
20	O	Lo/Hi	CONV. CH3/CH4	CH-3/CH-4 switching control signal output.
21	O	Hi/Lo	TV (L) / VCR	RF converter (VCR/TV switching) control signal output.
22	I	–	B5V	Connected to B5V.
23	O	Pulse	SW30Hz-A	Head switching pulse output for audio circuits.
24	O	Pulse	SW30Hz	Head switching pulse output.
25	O	PWM	CAPST. PWM	Cylinder and capstan motor servo control outputs.
26	O	PWM	CYL. PWM	
27	O	Hi	V.PULSE	Artificial V sync signal for trick play.
28	O	Pulse	C. ROTARY	Chroma rotation control signal.
29	O	Hi/Lo	H. AMP SW	SP/EP head switching control signal (pulse during trick play).
30	I	Hi/Lo	COMP	SP/EP head switching control signal (pulse during trick play).
31	I/O	Pulse	CTL (+)	CTL signal input/output.
32	I/O	Pulse	CTL (–)	
33	–	–	GND	Ground.
34	I	Pulse	CTL AMP 1	CTL amp inputs.
35	I	Pulse	CTL AMP 2	
36	I	Pulse	CTL AMP 3	
37	O	Pulse	CTL AMP (O)	CTL amp output.
38	I	Pulse	CYL.FG	Cylinder FG (CYL.FG) pulse input. Controls the cylinder speed during recording and playback.
39	I	Pulse	TACH PULSE	Tach pulse input. Comparison (feedback) signal which controls the recording cylinder phase.

Pin No.	I/O	Active Level	Abbreviation	Function
40	I	Pulse	CAPST.FG	Capstan FG (CAPST.FG) pulse input. Used to control the capstan motor.
41	I	–	5V	Connected to 5V.
42	I	–	5V	Connected to 5V.
43	I	–	C.VIDEO	Video signal input.
44	O	–	V.REF	Reference bias/clamp bias voltage.
45	O	–	C.VIDEO OUT	Video signal output.
46	–	–	CHARA. BIAS	Not used.
47	–	–	AFC LPF	An LPF is attached externally for AFC.
48	–	–	AFC OSC	Oscillator for AFC.
49	–	–	GND	Ground.
50	I	Pulse	DOSC IN	OSD dot clock oscillator.
51	O	Pulse	DOSC OUT	
52	O	–	2fsc (7.16MHz)	These generate a 7.16MHz signal as the clock signal for the OSD and servo circuits.
53	I	–	2fsc (7.16MHz)	
54	I	Pulse	C.SYNC	Composite sync signal input. Controls the cylinder speed during recording.
55	O	Hi	BLUE BACK	Blue background control signal output.
56	O	Hi	HIFI MUTE	Hi-Fi audio muting control output during recording.
57	O	Pulse	DATA (M-YC/LA)	Common communication lines with VIDEO/LINEAR AUD. ICs; data is transferred, synchronized with the clock signal.
58	O	Pulse	CLOCK (M-YC/LA)	
59	O	Lo	PB (L)	Sets the video/audio circuits to the playback mode.
60	O	Hi	REVERSE	Sets the drive direction of the capstan motor to reverse.
61	O	Hi	REC (AUDIO)	Sets the audio circuit to the recording mode.
62	O	Pulse	CTL RESET	Applies reset pulses to the CTL amp during slow and reverse slow play.
63	I	Lo	COPY GUARD	Not used.
64	O	Pulse	IR OUT	Signal output to the cable box control circuit.
65	O	Hi	UNLOAD	Loading motor drive signals which set the mechanism to the commanded mode.
66	O	Hi	LOAD	
67	O	Hi	LM CONT.	Flying erase control (not used)/signal to control the voltage applied to the loading motor when forward slow is switched to reverse slow and vice versa.
68	–	–	TEST	Ground.
69	I	–	X2 (32kHz)	These generate a 32.768kHz signal as the clock signal for the VCR's clock.
70	O	–	X1 (32kHz)	
71	–	–	GND	Ground.
72	I	–	OSC 1 (10MHz)	These generate a 10MHz signal as the system clock signal in modes other than back-up.
73	O	–	OSC 2 (10MHz)	
74	O	Hi	LINE MUTE	Audio output muting control.
75	O	Hi/Lo	CAPST. Q.R	Cylinder and capstan motor phase control outputs.
76	O	Hi/Lo	CYL. Q.R	
77	O	Hi	POWER CONT	Power on/off control. When the power switch is operated, a cassette is inserted or a power failure is detected, the internal power supply is switched to be on/off.
78	O	Lo	SP (L)	Tape speed output.
79	I	Hi	V. REC MUTE	Video signal record muting control. Prevents the signal from being supplied to the video heads.
80	O	Lo	EDS CE	LOAD signal between the M-μP and AUTO CLOCK IC.
81	O	Hi	MPX MUTE	Tuner audio muting control.
82	I	Pulse	IR PULSE	Receives the remote control code from the infrared receiver and sets the VCR to the specified mode. AV BUS data input.
83	–	–	EXP. LOAD	Not used.
84	O	Hi	REC	Sets the video and audio head amp circuits to the recording mode.

Pin No.	I/O	Active Level	Abbreviation	Function
85	I	Pulse	LINE 21	EDS LINE 21H pulse input.
86	I	Lo	REW END (L)	When "Lo" is input from the mechanism sensor, the current mode is released. Two sensors detect the two ends of tape. When "Lo" is input from both sensors, the M-μP detects that a cassette is not loaded in the VCR.
87	I	Lo	FWD END (L)	
88	I	Pulse	T.REEL	Calculates the period of the take-up reel pulse to detect whether or not slack tape is taken up on the reel. If slack tape is not taken up, the M-μP stops the mechanism. The supply reel pulses are used with the take-up reel pulses to calculate the tape remaining time.
89	I	Pulse	S.REEL	
90	I	Lo	CHECK	Checks short-circuits in the 5V/9V power supplies. (This pin goes "Lo" normally when power is off.)
91	O	Hi	ST/SAP OUT	Output to control the MTS decoder so it is set to the SAP mode.
92	I/O	Pulse	DATA (M–ROM/HA)	Common communication lines with the ROM/Hi-Fi AUD.; data is communicated, synchronized with the clock signal.
93	O	Pulse	CLOCK (M–ROM/HA)	
94	O	Hi/Mid/Lo	V. CAPST. CONT.	This is output in the slow, still, playback, recording, fast forward and rewind modes to control the voltage applied to the capstan motor. Lo: 13.5V, Mid: 9.5V, Hi: 7.5V.
95	O	Pulse	CLOCK (M–TU)	Communication lines with the U/V TUNER; data is transferred, synchronized with the clock signal.
97	O	Pulse	DATA (M–TU)	
96	I	Pulse	DATA (EDS–M)	EDS caption data input.
98	O	Pulse	CLOCK (M–LCD)	Communication lines with the LCD DRIVER; data is transferred, synchronized with the clock signal.
100	O	Pulse	DATA (M–LCD)	
99	O	Hi	LCD LOAD	LOAD signal between the M-μP and LCD-DRIVER.

4. Troubleshooting the Switching Regulator

This section summarizes the troubleshooting of defects in the switching regulator. Perform diagnosis, taking each defective phenomenon into consideration. Even if the same defective phenomenon appears, it may be caused by other circuits, not by the switching regulator, so use this item as a reference.

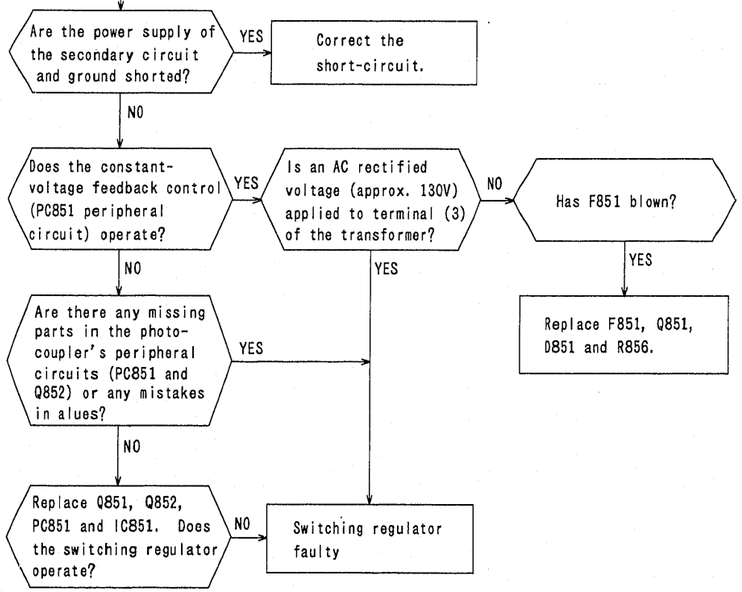
Cautions when checking and repairing the switching regulator circuit

When using test equipment to check the primary circuit (circuit No. 8XX) of the power supply, use a two-pole AC outlet for the test equipment. If a three-pole AC outlet (which is connected to ground) is used, the circuits could be broken. (Attach a conversion adapter to the test equipment plug to connect it to a three-pole outlet).

Be careful of electric shock

A heat sink which generates a high voltage is provided with Q851 in the switching regulator block. "HIGH VOLTAGE" is printed on the heat sink. Take great care of this section when servicing or handling the VCR when it is turned on.
(Supplement: The heat sinks of Q853 and Q864 do not generate a high voltage.)

Method to judge that the switching regulator is faulty

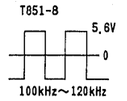

Are the power supply of the secondary circuit and ground shorted?
YES
Correct the short-circuit.
NO
Does the constant-voltage feedback control (PC851 peripheral circuit) operate?
YES
Is an AC rectified voltage (approx. 130V) applied to terminal (3) of the transformer?
NO
Has F851 blown?
YES
Replace F851, Q851, D851 and R856.
NO
Are there any missing parts in the photo-coupler's peripheral circuits (PC851 and Q852) or any mistakes in alues?
YES
NO
Replace Q851, Q852, PC851 and IC851. Does the switching regulator operate?
NO
Switching regulator faulty

Troubleshooting by Observing Defective Phenomena

If the switching regulator is normal and there is a defect in another circuit (shorting between the power supply and ground of the secondary circuit), the protector circuit operates and the power is not turned on. If a defect occurs in the switching regulator, a phenomenon such that the VCR power is not turned on or the power fuse has blown also occurs.

1. Power is not turned on

- Are the power supply of the secondary circuit and ground shorted? — YES → Correct the short-circuit.
- NO
- Are any parts of the constant-voltage feedback citcuits (PC851, Q852, and IC851 peripheral circuits) installed incorrectly or some values mistaken? — YES → Install the correct parts.
- NO
- Is an AC rectified voltage (approx. 130V at D851's anode) applied to terminal (1) of the transformer? — YES → L851, D851 or/and C851 faulty (especially, it is highly possible that L851 and D851 are faulty.)
- NO
- Is the resistance of R856 incorrect when measured by a tester? — YES → R856 faulty
- NO
- Is 5.4V present at the 5V line (positive terminal of C873) of the secondary output ? — YES → Has the IC protector (QF851) blown ? — NO → Circuits other than power supply faulty
- YES → Replace the IC protector
- NO
- Is the oscillation waveform at the 5V terminal of the secondary transformer output normal ? — NO → T851 faulty
- YES → IC851 or D858 faulty



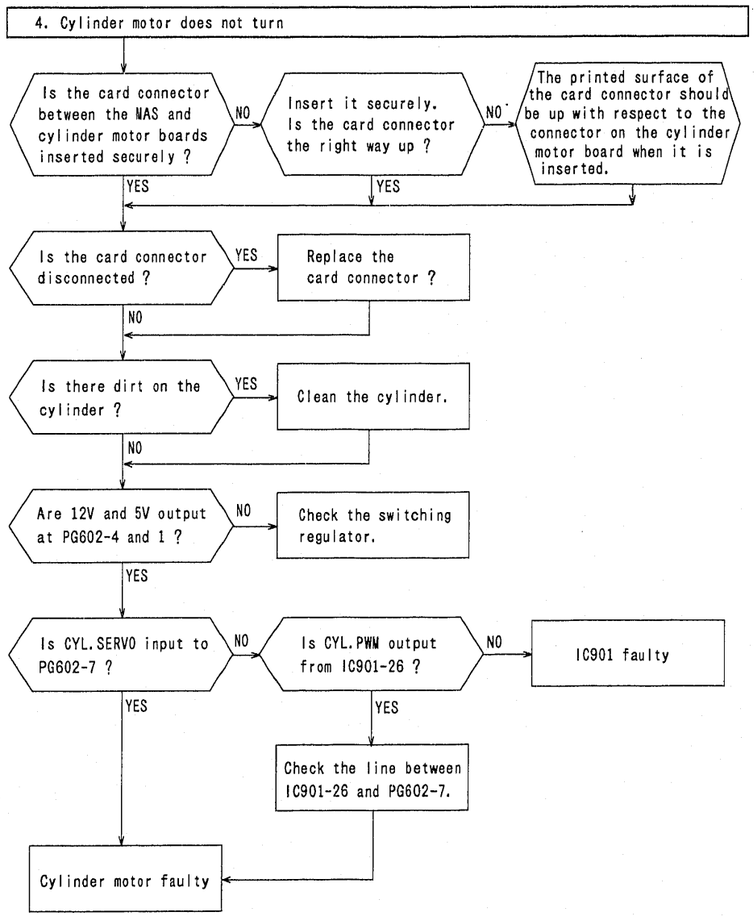
2. LCD does not light

- Are A5V and 9V output ? — NO → Check the switching regulator.
- YES
- Are the DATA, CLOCK, and LOAD signals output from the main μP ? — YES → If adjacent patterns touch, correct the soldering.
- NO → Replace IC1701.

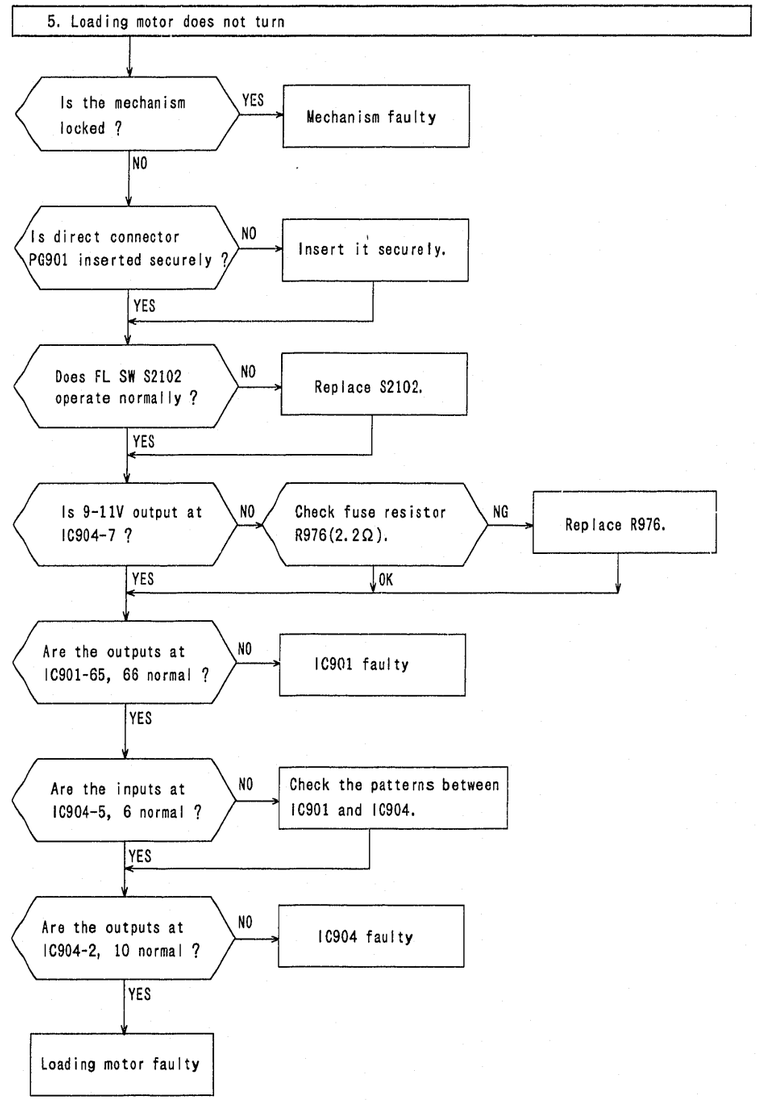
3. Capstan motor does not turn

- Is direct connector PG601 inserted securely ? — NO → Insert it securely.
- YES
- Is the loading mechanism locked ? — YES → Mechanism faulty
- NO
- Is V.CAPST CONT. output at IC901-94 ? — NO → Check the REG circuit and Q864's peripheral circuits.
- YES
- Is CAPST.PWM output at IC901-25 ? — YES → Is the correct voltage present at PG601-1 ? — YES → Capstan motor faulty
- NO → Check R605, C605 and the pattern.
- NO
- Turn the capstan motor with your hand. Is CAPST. FG input to IC901-40 ? — NO → Capstan motor faulty
- YES → IC901 faulty

4. Cylinder motor does not turn


Is the card connector between the MAS and cylinder motor boards inserted securely ?
NO
Insert it securely. Is the card connector the right way up ?
NO
The printed surface of the card connector should be up with respect to the connector on the cylinder motor board when it is inserted.
YES
YES
Is the card connector disconnected ?
YES
Replace the card connector ?
NO
Is there dirt on the cylinder ?
YES
Clean the cylinder.
NO
Are 12V and 5V output at PG602-4 and 1 ?
NO
Check the switching regulator.
YES
Is CYL.SERVO input to PG602-7 ?
NO
Is CYL.PWM output from IC901-26 ?
NO
IC901 faulty
YES
YES
Check the line between IC901-26 and PG602-7.
Cylinder motor faulty

5. Loading motor does not turn



HITACHI

VT-FX610A
VT-FX611A
VT-FX613A

TK №.4601E

Image & Information Media Systems Division, Tokai

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Printed in Malaysia (II)

HITACHI

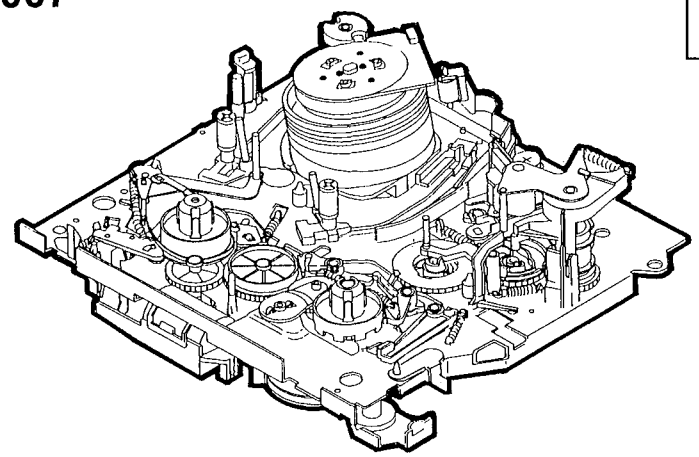
SERVICE MANUAL

V17007

TK | No.4527E

US Mechanism

This service manual includes the procedures to dismantle, adjust and maintain the US mechanism. Use this together with the manual of each VCR model.



VHS
SVHS

Please read this service manual throughly before servicing. Be sure to observe the cautions described in this manual so the safety of the product can be maintained.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO CASSETTE RECORDER

October 1995 Video & Personal Media Systems Division, Tokai Operation

SAFETY PRECAUTIONS

NOTICE: Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis.

1. When replacing a chassis in the instrument, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment covers/shields, isolation resistors/capacitors, etc.
2. When service is required, observe the original lead-dress. Extra precautions should be taken to assure correct lead dress in the high voltage circuit.
3. Always use the manufacturer's replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacturers'. Furthermore, where a short-circuit has occurred, replace those components that indicate evidence of overheating.
4. Before returning an instrument to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective or inadvertently defeated during servicing. Therefore, the following checks should be performed for the continued protection of the customer and service technician.

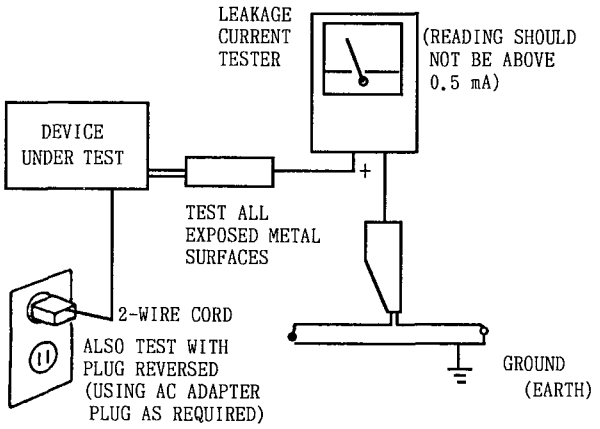
Leakage Current Cold Check

With the AC plug removed from the AC120V, 60Hz source, place a jumper across the two plug prongs. Turn the AC power switch on. Using an insulation tester (DC500V), connect one lead to the jumpered AC plug and touch the other lead to exposed metal parts (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of 0.3 Mohm and a maximum resistor reading of 5 Mohm. Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a AC120V, 60Hz outlet (do not use an isolation transformer for this check).

Turn the AC power switch on. Using a "Leakage Current Tester", measure for current from all exposed metal parts of the cabinet (antennas, screwheads, metal overlays, control shaft, etc.), particularly an exposed metal part having a return path to the chassis, to a known ground (earth) (water pipe, conduit, etc.). Any current measured must not exceed 0.5 mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE UNIT TO THE CUSTOMER.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts have special safety-related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for a higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual. Electrical components having such features are identified by marking with a ⚠ on the schematics and the parts list in this Service Manual. The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards. Product safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies for, HITACHI Service Manual may be obtained at a nominal charge from HITACHI SALES CORPORATION.

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CHAPTER 1 GENERAL INFORMATION

Appearances of US Mechanism

1. Top View of US Mechanism (I)

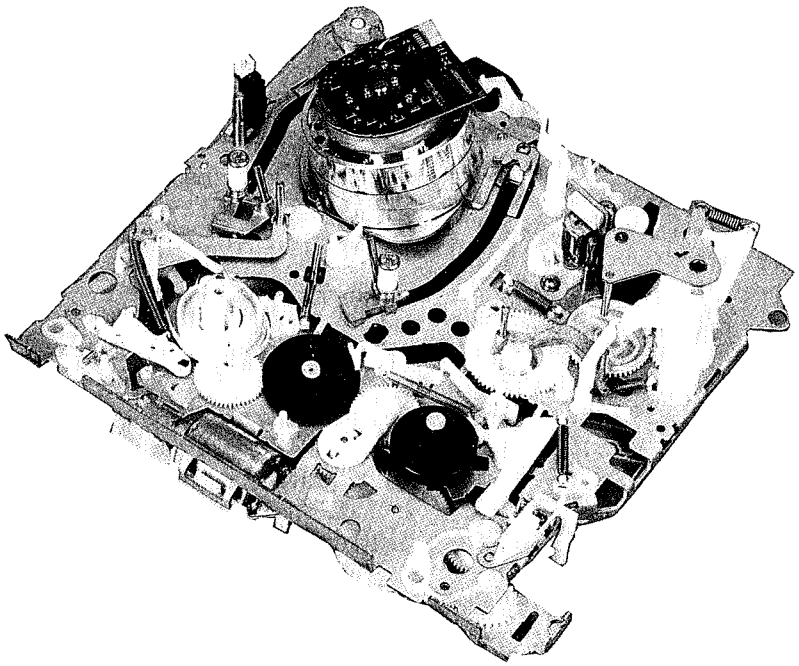


Fig. 1-1

2. Top View of US Mechanism (II)

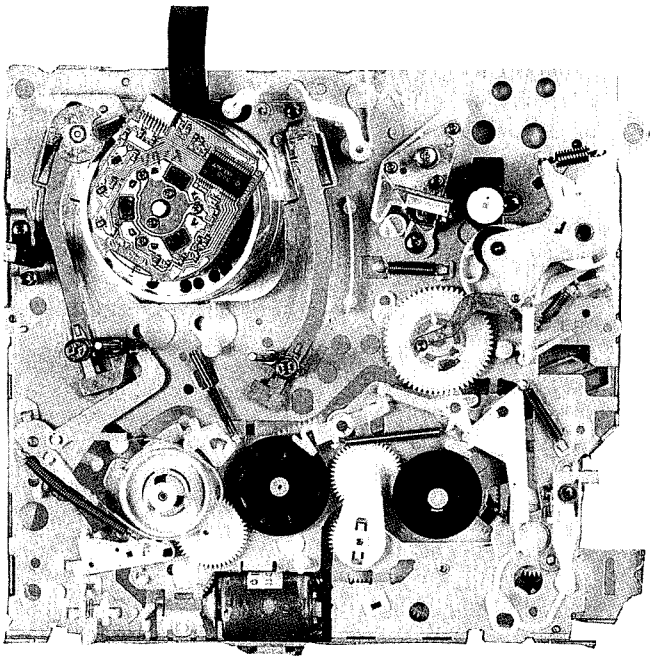


Fig. 1-2

3. Bottom View of US Mechanism (I)

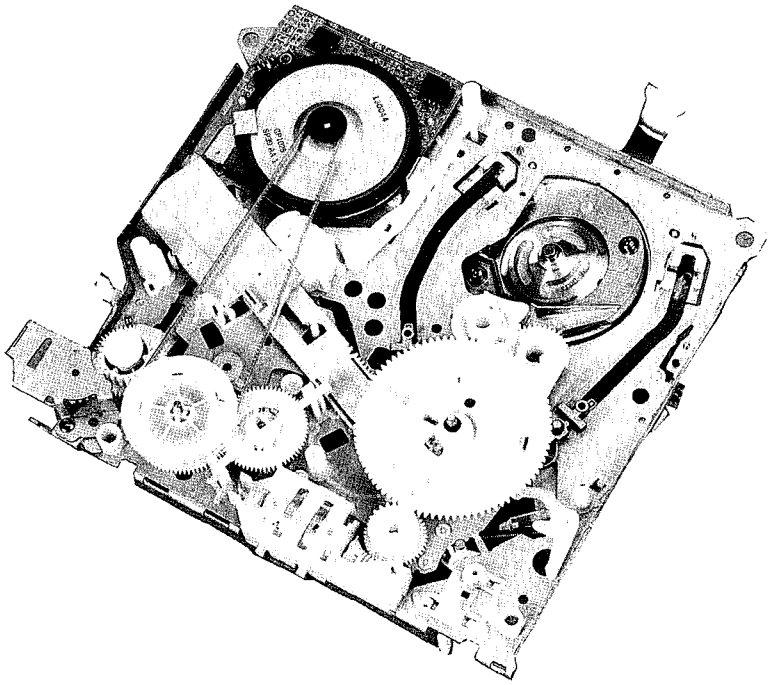


Fig. 1-3

4. Bottom View of US Mechanism (II)

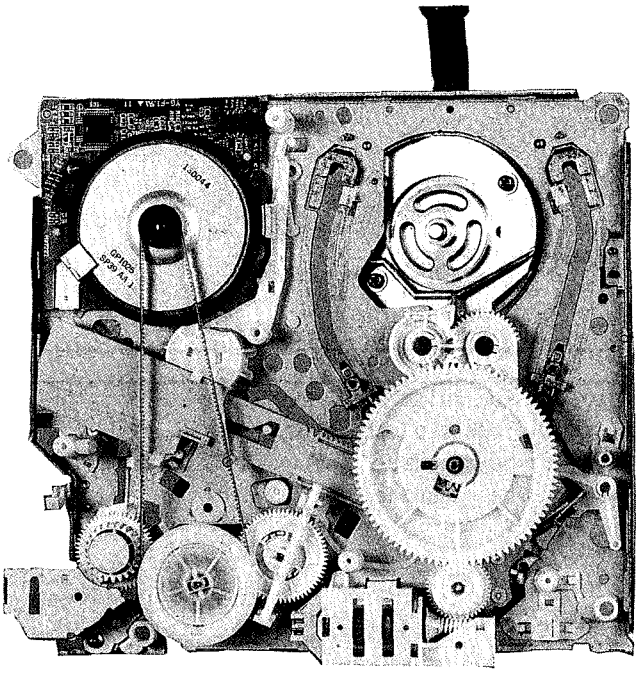


Fig. 1-4

How to Remove the Cassette when a Malfunction Has Occurred in the Mechanism

If a cassette is caught in the mechanism because of a malfunction in the mechanism, remove it by the following procedure.

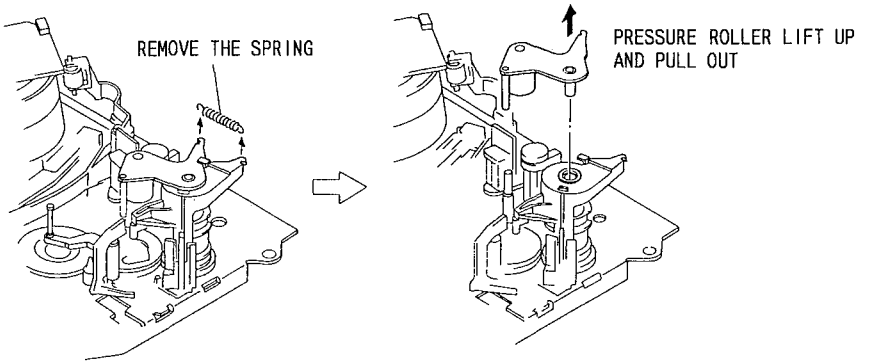
[Work Procedure]

1. Remove the top cover.
2. Remove the front panel.

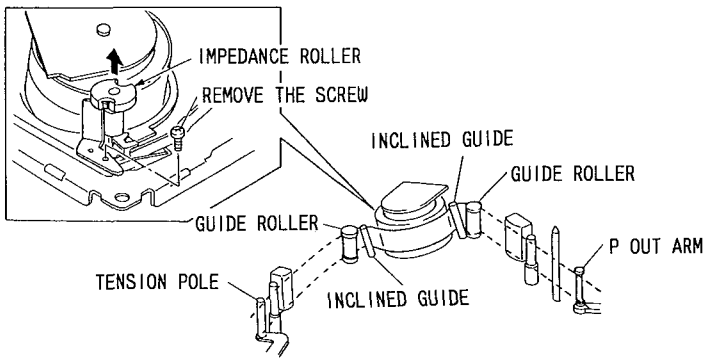
If the tape is wound round the cylinder in the loading state

If the cassette does not come out from the FL mechanism in the unloading state.

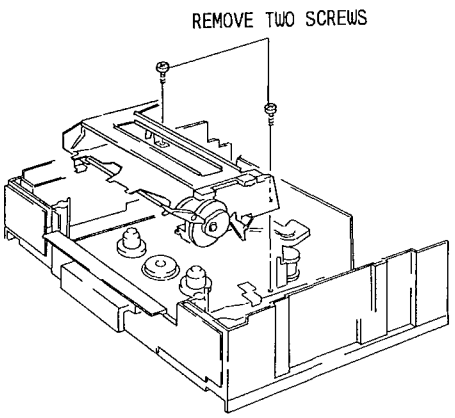
Remove the spring and lift the pressure roller to pull it out.



1) Remove the screw and lift the impedance roller together with the impedance plate.
2) Slacken the tape and release it from the tension pole, guide rollers, inclined guides and P out arm.



1) Remove two screws holding the FL mechanism.
2) Hold the cassette lid with your fingers so the tape is not damaged and remove the FL mechanism.
3) Remove the slack tape and eject the cassette.



CHAPTER 2 DISASSEMBLY

1. Before Starting Disassembly

1) Unplug the power cord from the AC outlet.
2) [Removal procedure]
   If a special procedure is required when dismantling any component, it is indicated using numbers. Follow the numbers (①, ②, ③ ...) shown in the illustrations.

[Reinstallation procedure]
Reinstall each component in the reverse order to removal when otherwise not specified.

2. Identifications and Locations of Components of US Mechanism

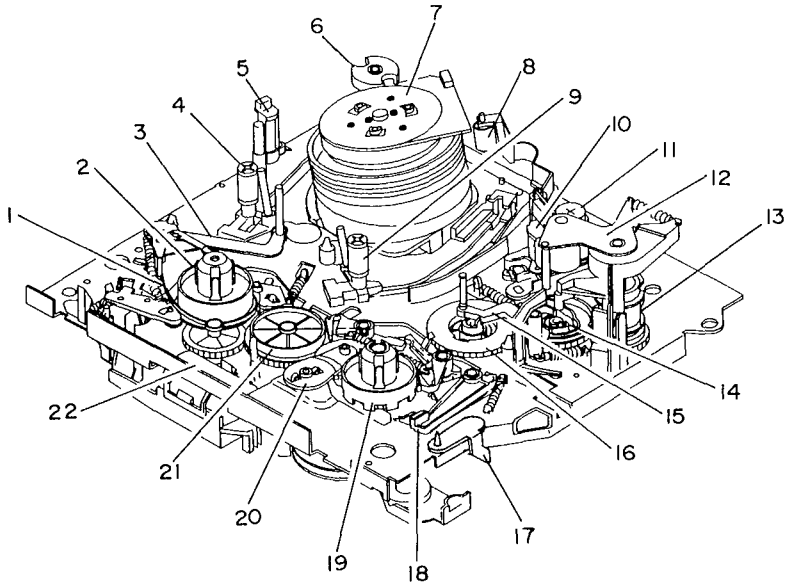


Fig. 2-1 Top View of US Mechanism

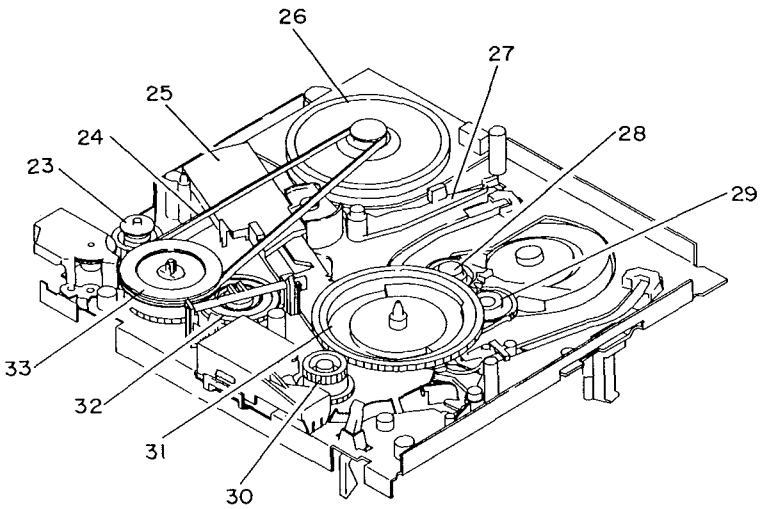


Fig. 2-2 Bottom View of US Mechanism

1. Tension band
2. Supply reel disk
3. Tension arm
4. Supply guide roller
5. Full erase (FE) head
6. Impedance roller
7. Cylinder motor
8. HC mechanism
9. Take-up guide roller
10. Audio/control (A/C) head
11. Capstan shaft
12. Pressure roller arm
13. Spiral gear
14. PR idler gear
15. P. out arm
16. P. drive gear
17. S-VHS switch (S-VHS VCR only)
18. Take-up brake
19. Take-up reel disk
20. FR arm
21. Idler gear 2
22. Loading motor
23. FL change gear
24. Drive belt
25. Slider
26. Capstan motor
27. FS brake
28. Loading gear (R)
29. Loading gear (L)
30. LM wheel gear
31. Cam gear
32. Torque change gear
33. Pulley assembly

3. US Mechanism Disassembly Method

When replacing defective parts, first refer to the "parts hierarchy chart" shown below. This chart shows the procedure for parts removal when replacing defective parts.

[How to use the parts hierarchy chart]

(1) Locate the part to be replaced.
(2) Check the parts in the ranks above the part to be replaced and start dismantling.
(3) Replace the defective part and reinstall the parts in the reverse order to that shown in the parts hierarchy chart.

Removal of Heads and Motors

Note: Dismantle parts in the eject state.

Parts to remove	Item
FE head	3-1
A/C head	3-2
★ Cylinder motor	3-3
★ Capstan motor	3-4
★ Loading motor	3-5

Removal of Tape Transport Parts

Note: Dismantle parts in the eject state.

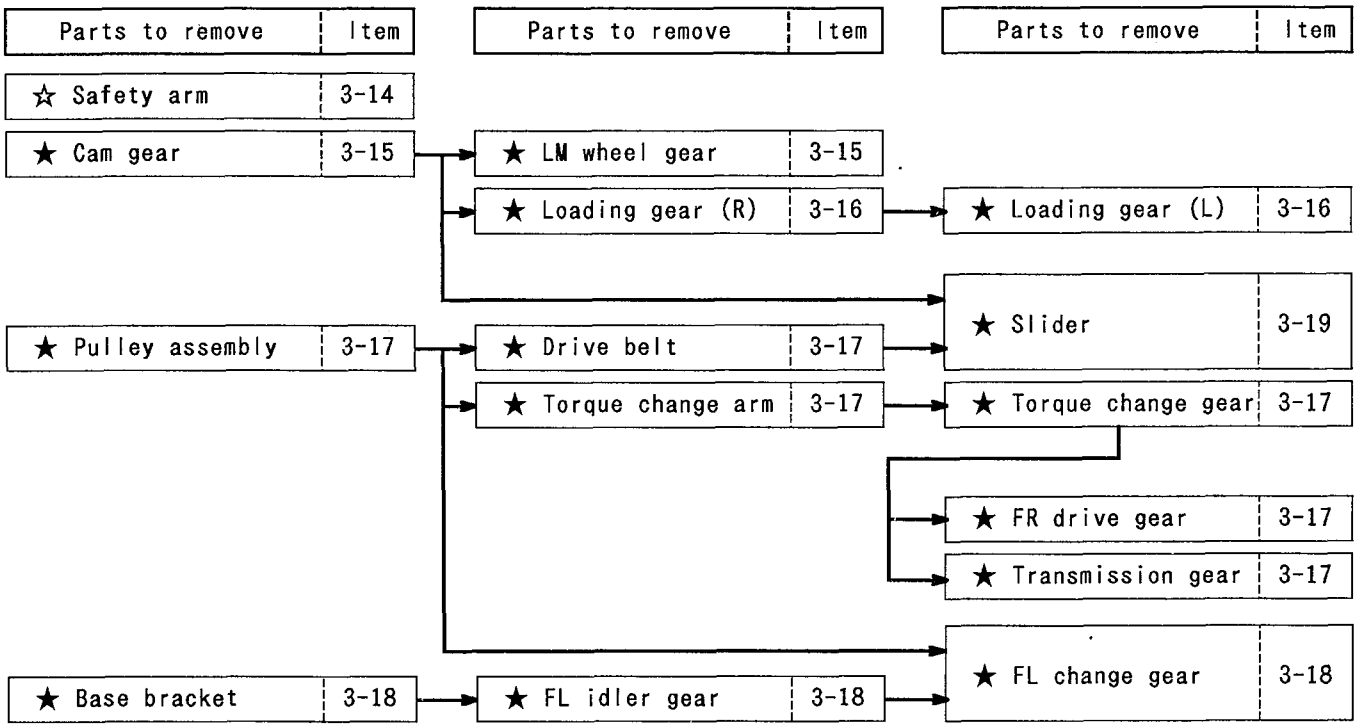
Parts to remove	Item	Parts to remove	Item	Parts to remove	Item
☆ Tension arm	3-6	☆ Tension band	3-6		
		☆ Jog arm	3-6		
		☆ Supply subbrake	3-7	☆ Supply reel disk	3-7
☆ Brake (L)	3-7	☆ Idler gear 2	3-7	☆ Idler gear 1	3-7
Impedance plate	3-8	Impedance roller	3-8		
HC mechanism	3-8	★ FS brake	3-12		
Pressure roller arm	3-9	☆ Spiral gear	3-10		
☆ P. out arm	3-10	☆ PR Idler gear	3-11	★ P. drive gear	3-12
☆ Brake (R)	3-13	☆ Take-up brake	3-13		
		☆ Take-up reel disk	3-13	☆ FR arm	3-13

◆ How to interpret the symbols

- Dismantle the parts marked ☆ after the FL mechanism has been removed.
- Dismantle the parts marked ★ after the US mechanism has been removed from the VCR.
- The parts without any marks can be replaced with the top cover removed.

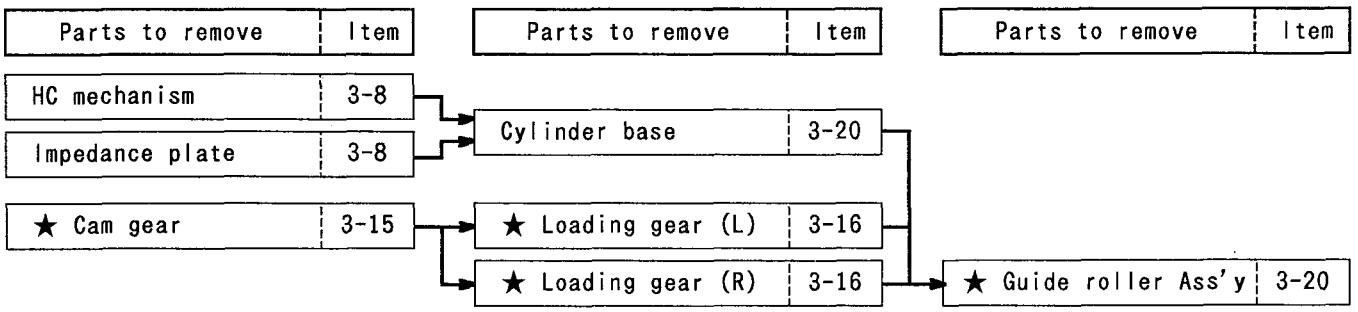
Removal of Tape Drive Parts

Note: Dismantle parts in the eject state.



Removal of Guide Roller Assemblies

Note: Dismantle parts in the eject state.



◆ How to interpret the symbols

- Dismantle the parts marked ☆ after the FL mechanism has been removed.
- Dismantle the parts marked ★ after the US mechanism has been removed from the VCR.
- The parts without any marks can be replaced with the top cover removed.

3-1. FE head

◆ Caution when reinstalling

1) Clean the surfaces of the FE head and supply guide roller with which the tape comes into contact.

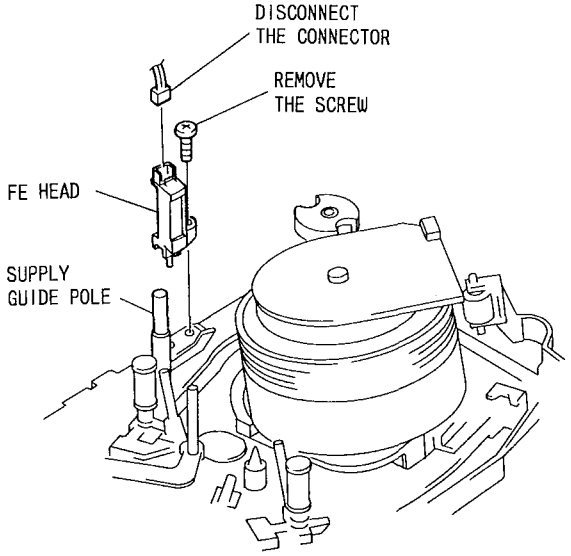


Fig. 3-1

3-2. A/C head

◆ Caution when reinstalling

1) Clean the surface of the A/C head with which the tape comes into contact.

◆ Mechanism adjustment after reinstalling

1) Audio/control (A/C) head adjustment

◆ Electrical adjustment after reinstalling

1) X-value adjustment

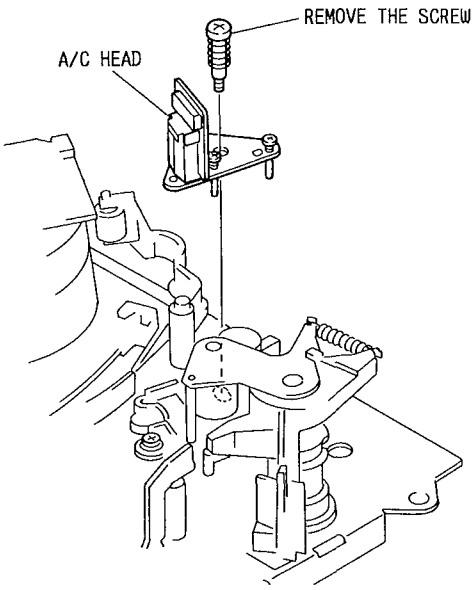


Fig. 3-2

3-3 Cylinder motor assembly

◆ Caution during work

1) Do not touch the video head tips.

◆ Mechanism adjustment after reinstalling

1) Adjustments after replacing the cylinder

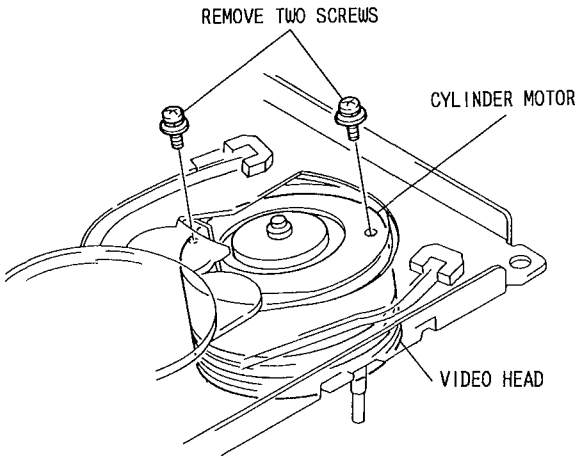


Fig. 3-3

3-4. Capstan motor

◆ Caution when reinstalling

1) Clean the surface of the capstan shaft with which the tape comes into contact.

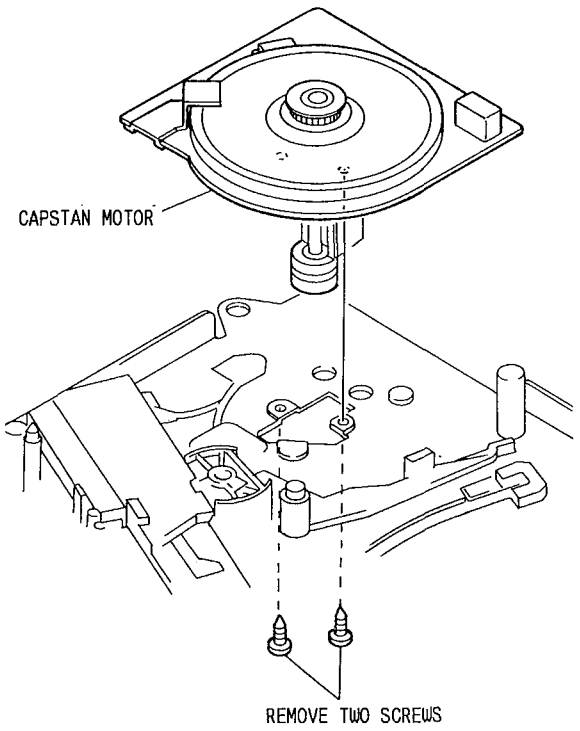


Fig. 3-4

3-5. Loading motor

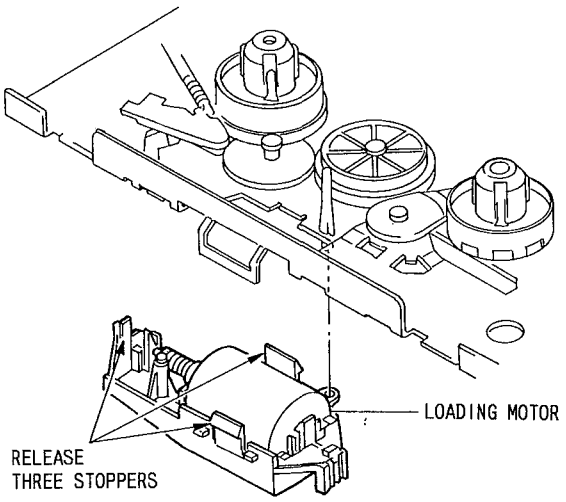


Fig. 3-5

3-6. Tension arm, tension band and jog arm

◆ Caution when reinstalling

1) Clean the surface of the tension pole with which the tape comes into contact.

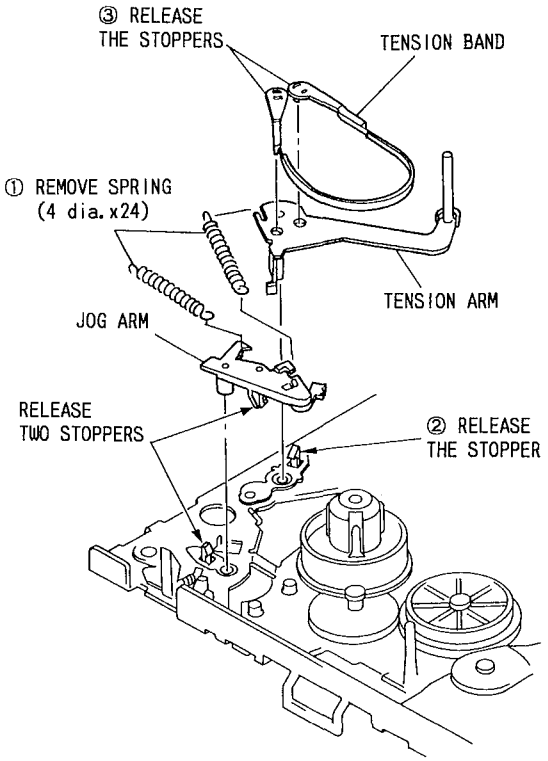


Fig. 3-6

3-7. Supply subbrake, supply reel disk, brake (L), idler gears 1 and 2

◆ Mechanism adjustment after reinstalling

1) Reel disk height adjustment

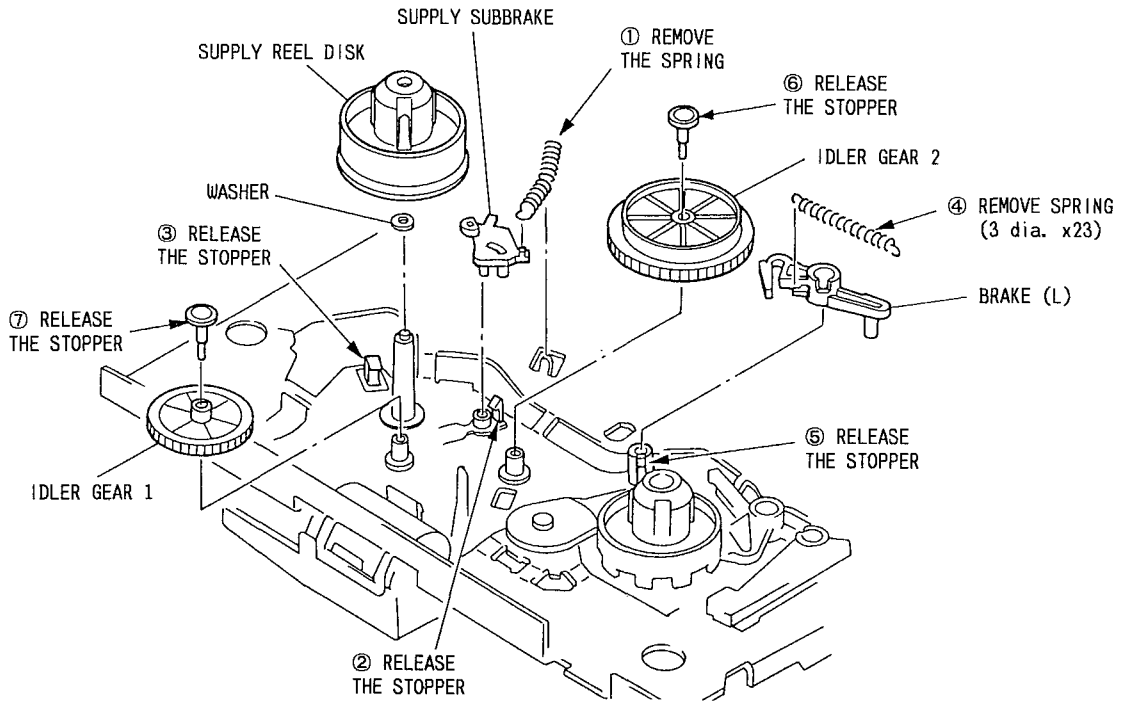


Fig. 3-7

3-8. Impedance roller and HC mechanism

◆ Caution when reinstalling

1) Check that the HC mechanism arm is set to the specified position.

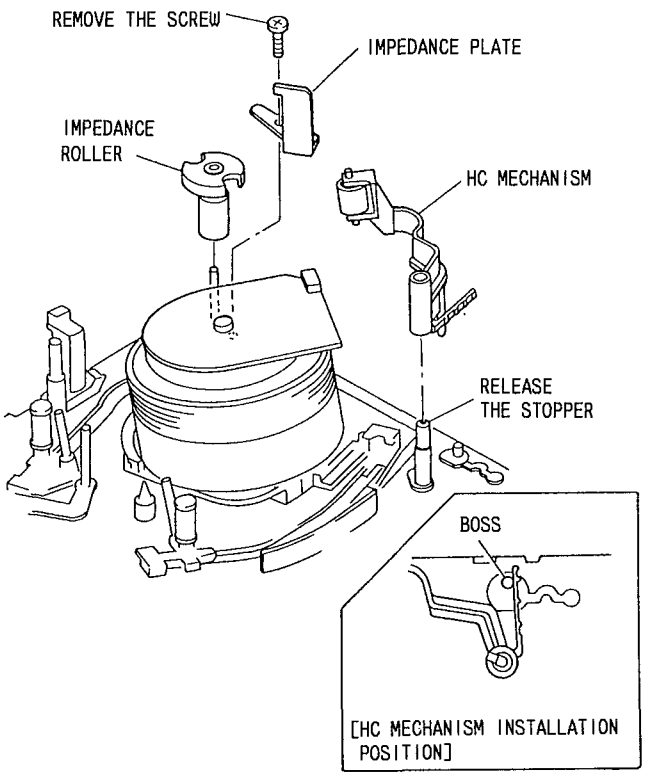


Fig. 3-8

3-9. Pressure roller arm

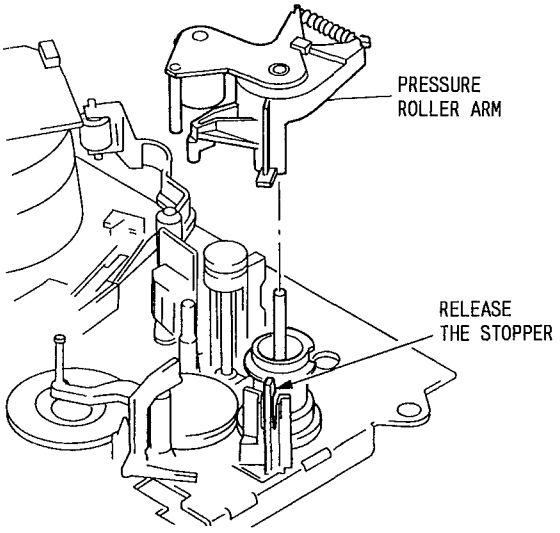


Fig. 3-9

3-10. Spiral gear and P. out arm

◆ Cautions when reinstalling

1) Align the gear positions of the spiral gear and PR idler gear.
2) Clean the surface of the P. out arm with which the tape comes into contact.
3) Check that the P. out arm is set to the specified position.
4) Turn the lid opener counterclockwise to lock it.

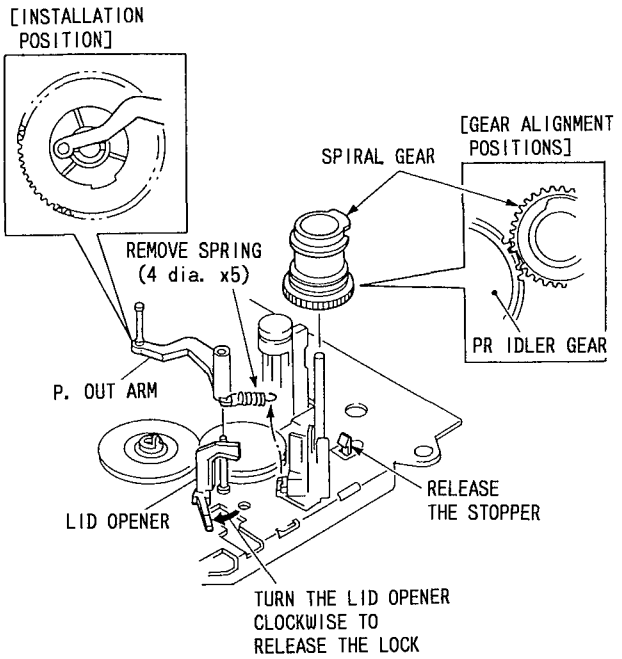


Fig. 3-10

3-11. PR idler gear

◆ Caution when reinstalling

1) Align the gear positions of the P. drive gear and PR idler gear.

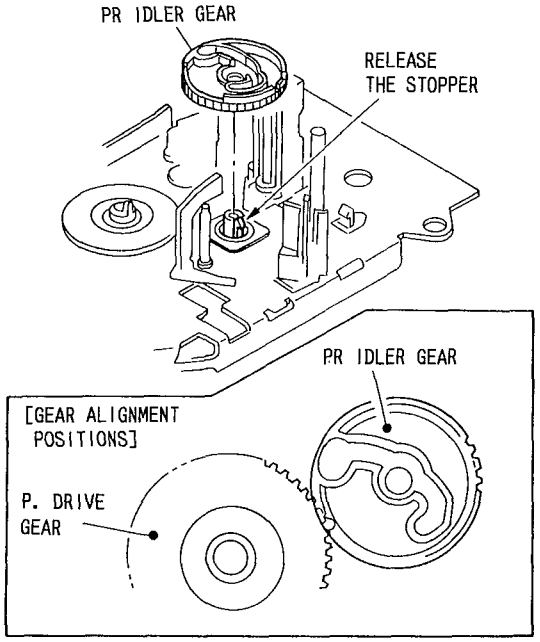


Fig. 3-11

3-12. FS brake and P. drive gear

◆ Caution when reinstalling

1) Align the positions of the P. drive gear and slider.

【Items to be checked around the pressure roller】

(A) Engaged section between the spiral gear and PR idler gear

(B) △ mark (No. 1) on the P. drive gear and ▽ mark on the spring hook

(C) Engaged section between the PR idler gear and P. drive gear

(D) The lid opener is locked in the specified position.

(E) Engaged section between the P. drive gear and slider

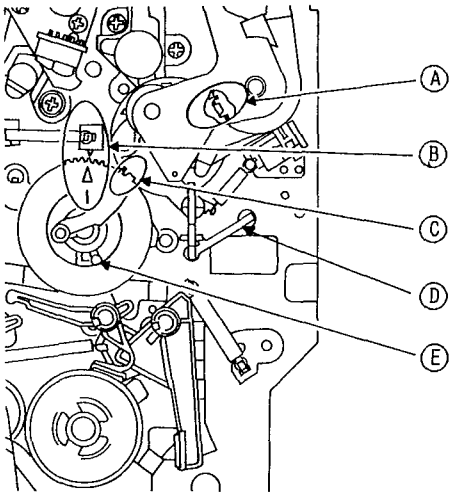


Fig. 3-12

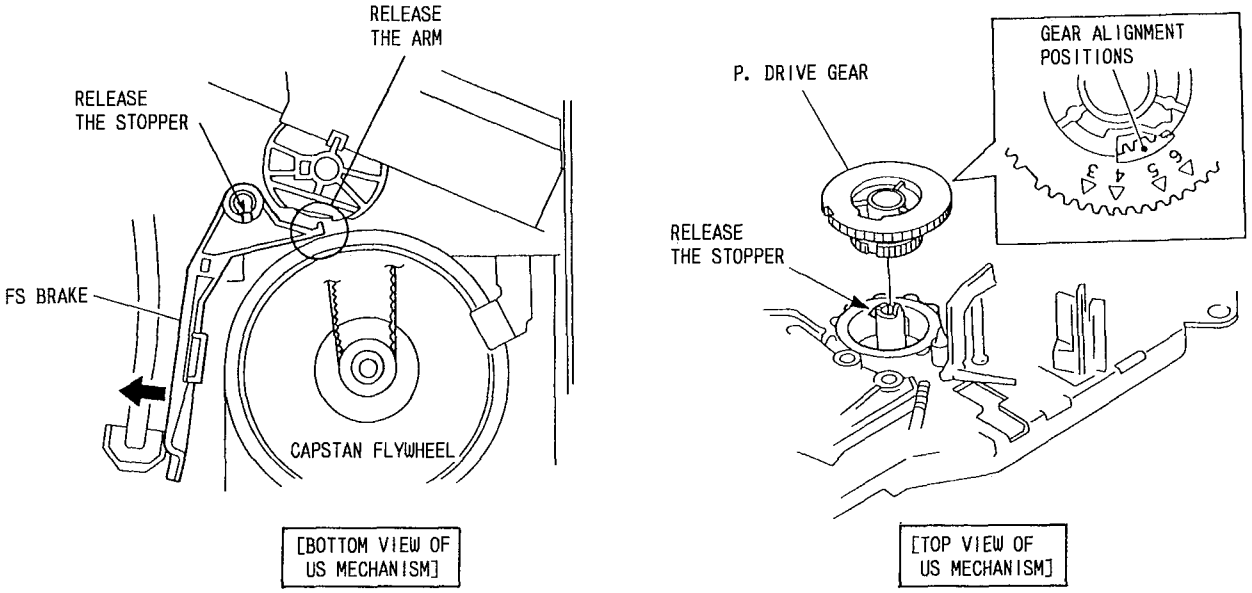


Fig. 3-13

3-13. Brake (R), Take-up brake, take-up reel disk and FR arm

◆ Mechanism adjustment after reinstalling

1) Reel disk height adjustment

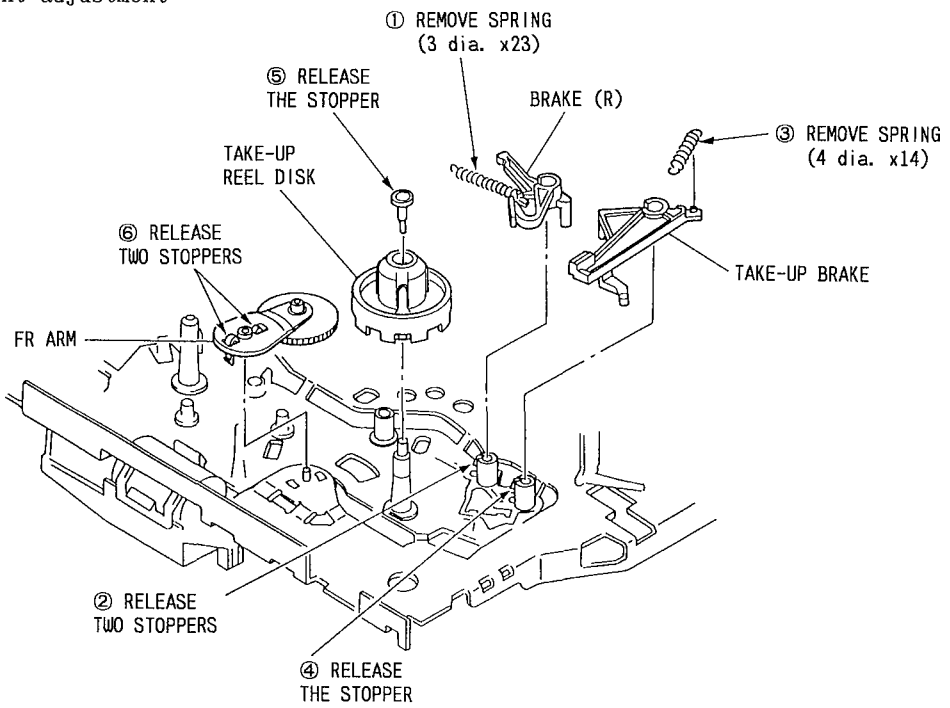


Fig. 3-14

3-14. Safety arm

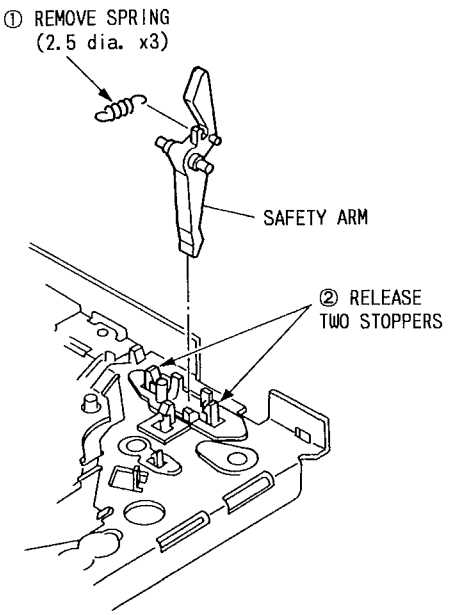


Fig. 3-15

3-15. Cam gear and LM wheel gear

◆ Caution when reinstalling

1) Align the positions of the cam gear and slider.

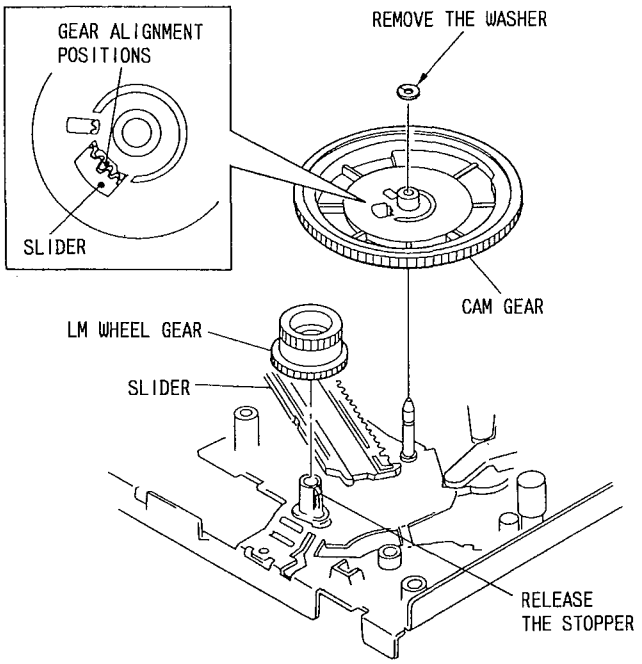


Fig. 3-16

3-16. Loading gears (R) and (L)

◆ Caution when reinstalling

1) Align the positions of loading gears (R) and (L).

【Items to check concerning gear alignment around loading gears】

(A) Engaged section between loading gears (R) and (L)

(B) Engaged section between the cam gear and slider

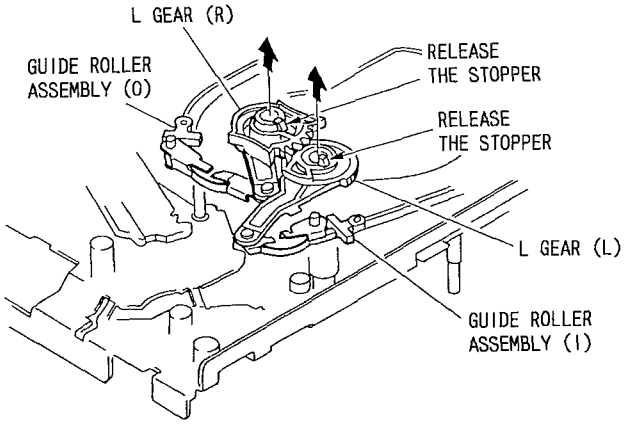


Fig. 3-17

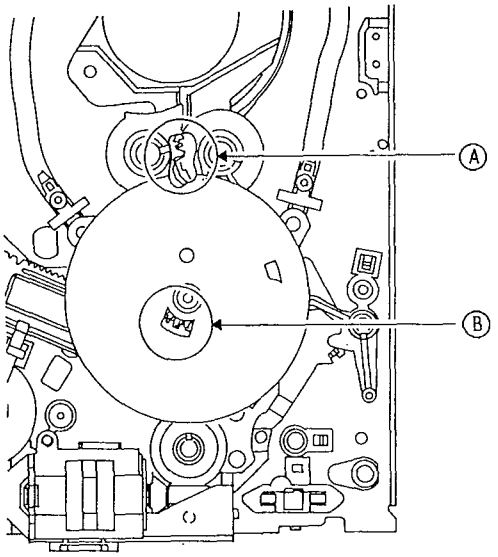


Fig. 3-18

3-17. Pulley assembly, drive belt, torque change arm, torque change gear, FR drive gear and transmission gear

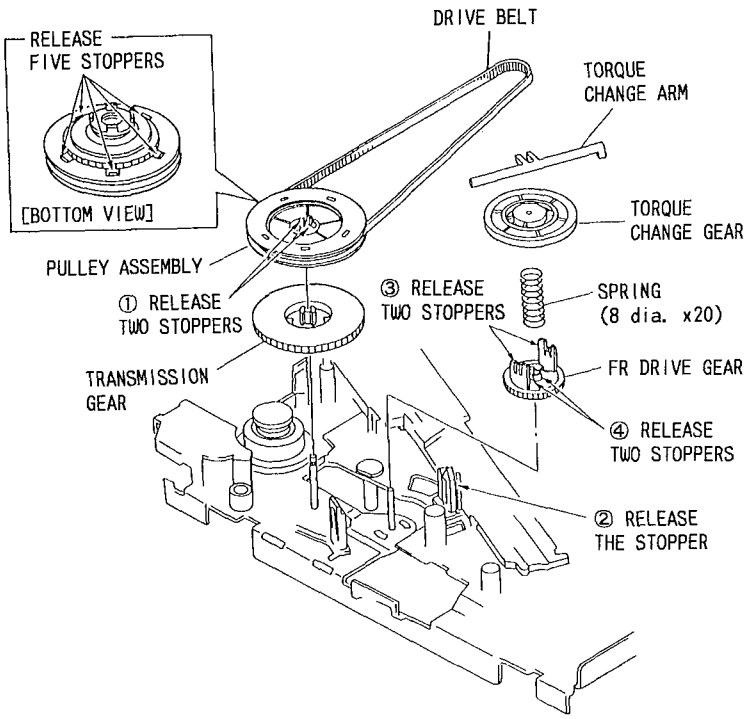


Fig. 3-19

3-18. FL idler gear and FL change gear

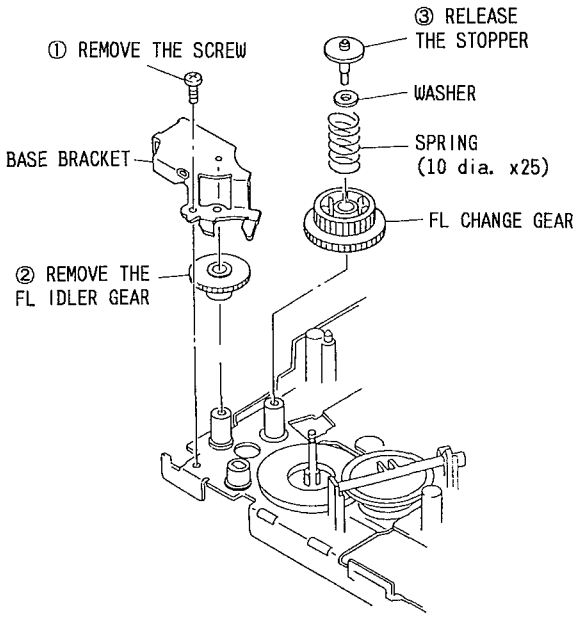


Fig. 3-20

3-19. Slider

◆ Tips when reinstalling

1) Align the projection at the left of the slider and the boss of the chassis.
2) Pull the take-up brake in the direction of the arrow and reinstall the slider.

[TIP FOR INSTALLATION (1)]

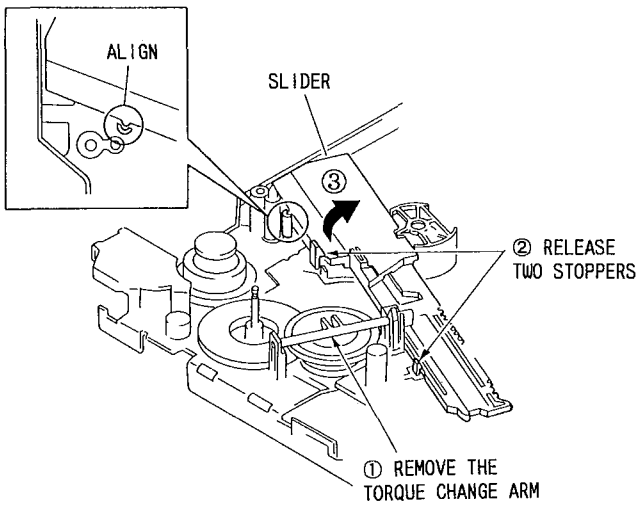


Fig. 3-21

[TIP FOR INSTALLATION (2)]

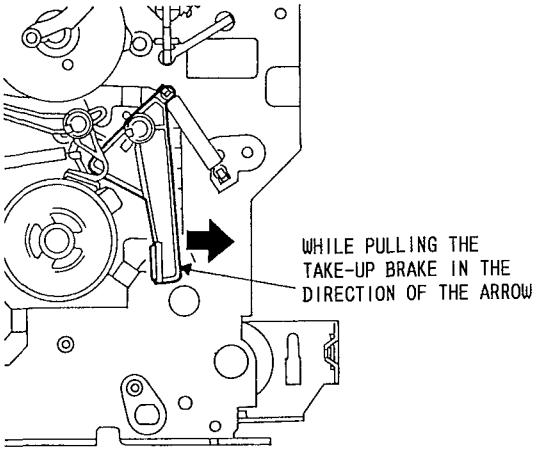


Fig. 3-22

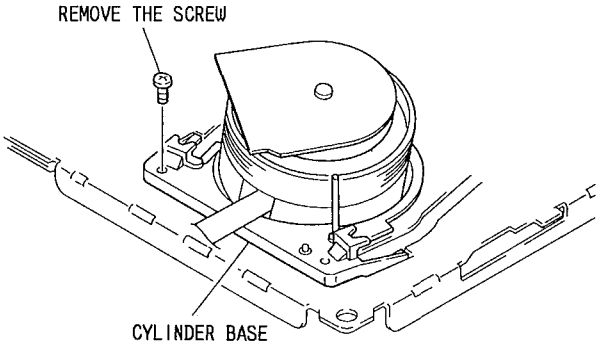
3-20. Cylinder base and guide roller assemblies

◆ Caution when reinstalling

1) Clean the surfaces of the guide rollers with which the tape comes into contact.

◆ Mechanism adjustment after reinstalling

1) Guide roller height adjustment



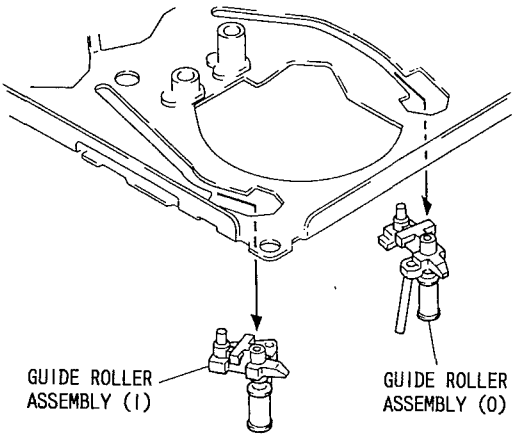


Fig. 3-23

Item to Check After Reinstalling the US Mechanism

After dismantling the mechanism or replacing its components, reinstall the components in their original positions correctly and perform the following checks.

Checking the surface of US mechanism

(A) The HC mechanism is set in the correct position.
(B) The engaged section between the spiral gear and PR idler gear is correct.
(C) The engaged section between the PR idler gear and P. drive gear is correct.
(D) The P. out arm is set to the correct position.
(E) The engaged section between the P. drive gear and slider is correct.

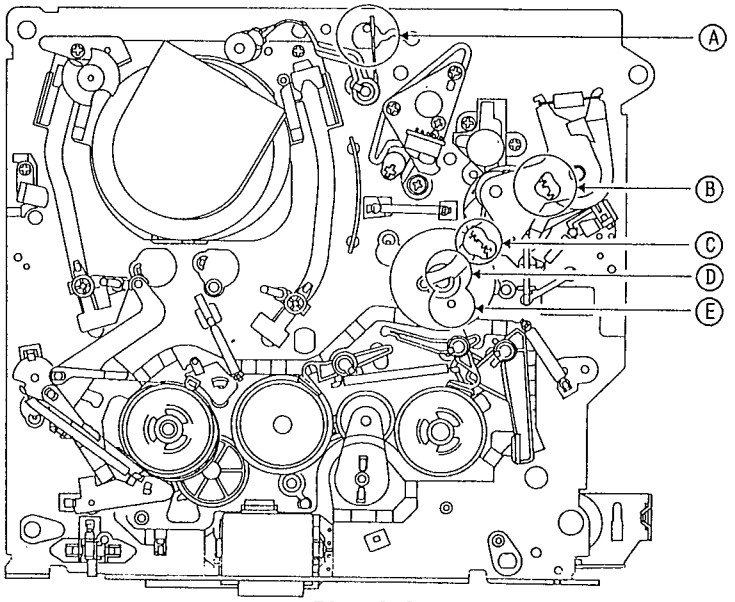


Fig. 3-24

Checking the bottom of US mechanism

(A) The projection of the slider and the boss of chassis are aligned.
(B) The engaged section between the loading gears (R) and (L) is correct.
(C) The sections in which the cam gear and slider are engaged are correct.

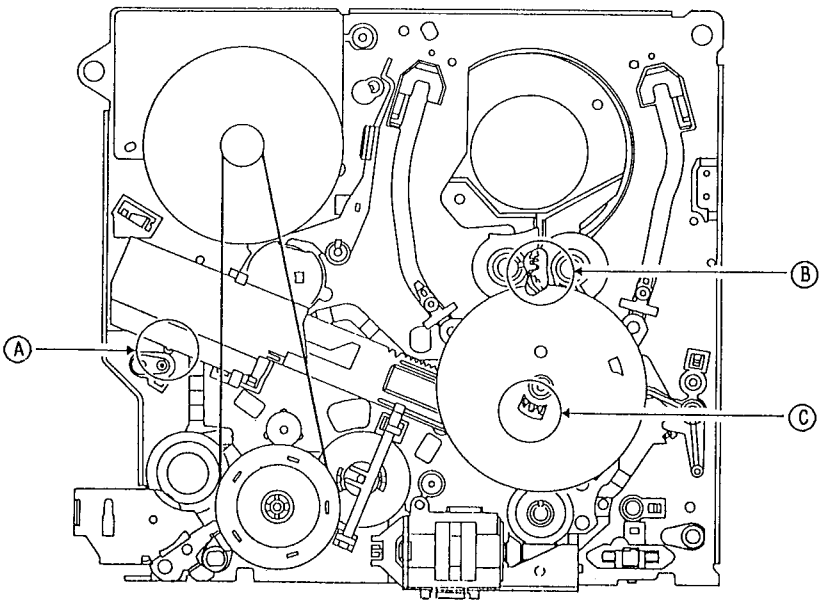
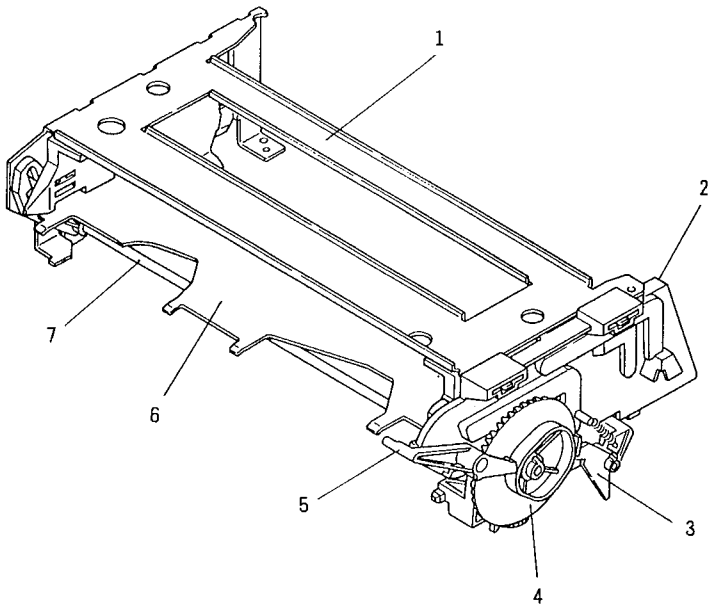


Fig. 3-25

4. Identifications and Locations of Parts in US-FL Mechanism



1. Side bracket (L)
2. Side bracket (R)
3. Switch arm
4. Bevel gear
5. Door arm
6. Cassette holder
7. FL drive arm

Fig. 4-1

5. Procedure to Dismantle the US-FL Mechanism

5-1. Door arm, switch arm, bevel gear and FL gear

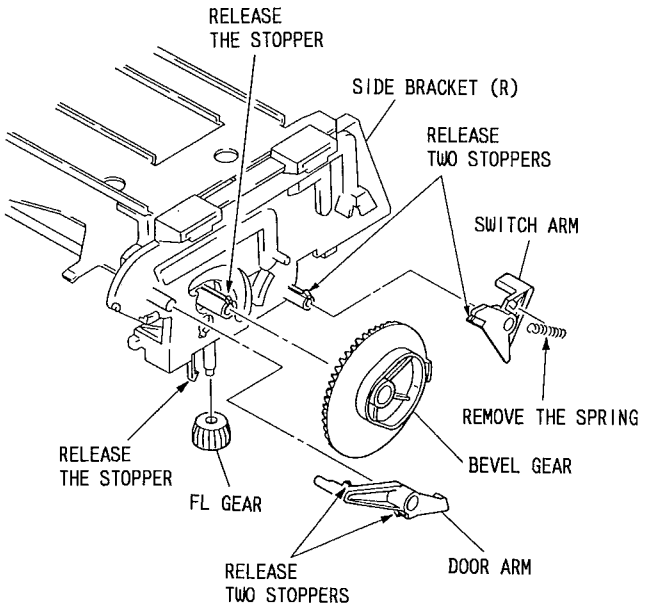


Fig. 5-1

◆ Caution when reinstalling

1) Reinstall the bevel gear so the holders in the bevel gear and side bracket (R) are aligned.

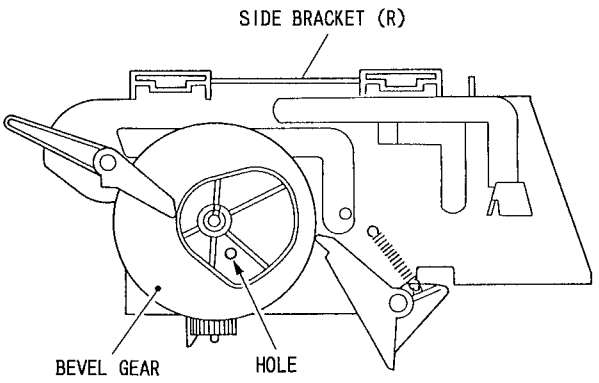


Fig. 5-2

5-2. Side brackets (R) and (L), cassette holder and FL drive arm

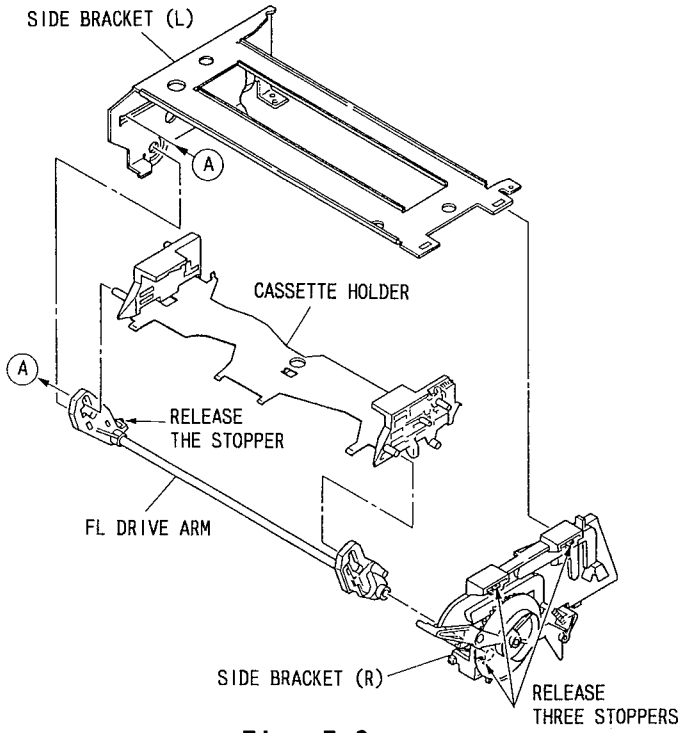


Fig. 5-3

◆ **Cautions when reinstalling**

1) Check the insertion of seven bosses.
2) Align hole (a) in side bracket (R) and the hole in the bevel gear.

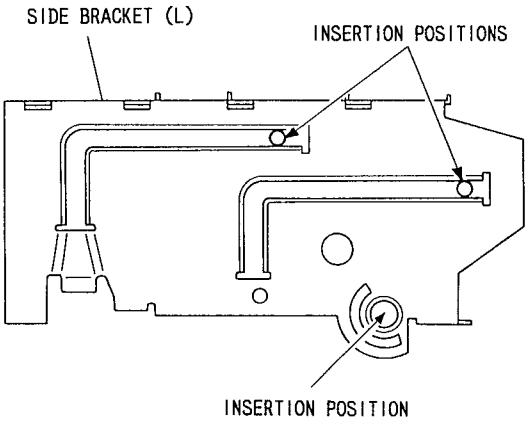


Fig. 5-4

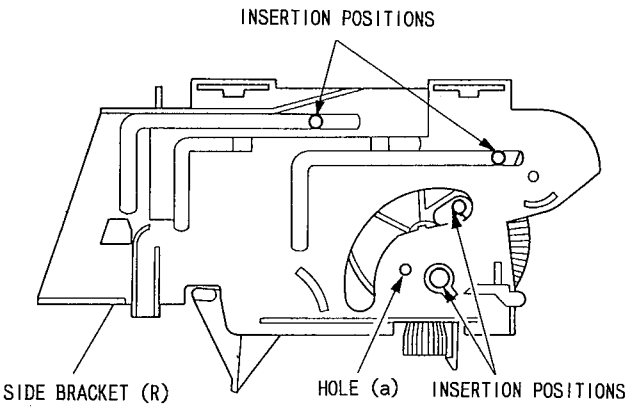
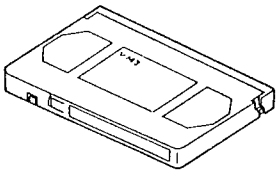
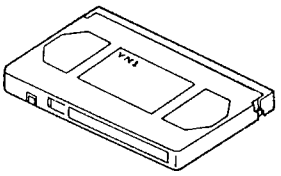
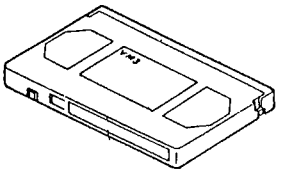
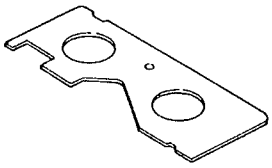
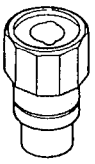
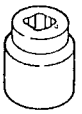
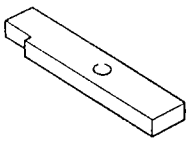
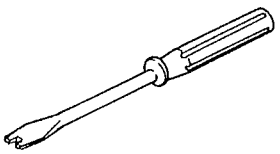


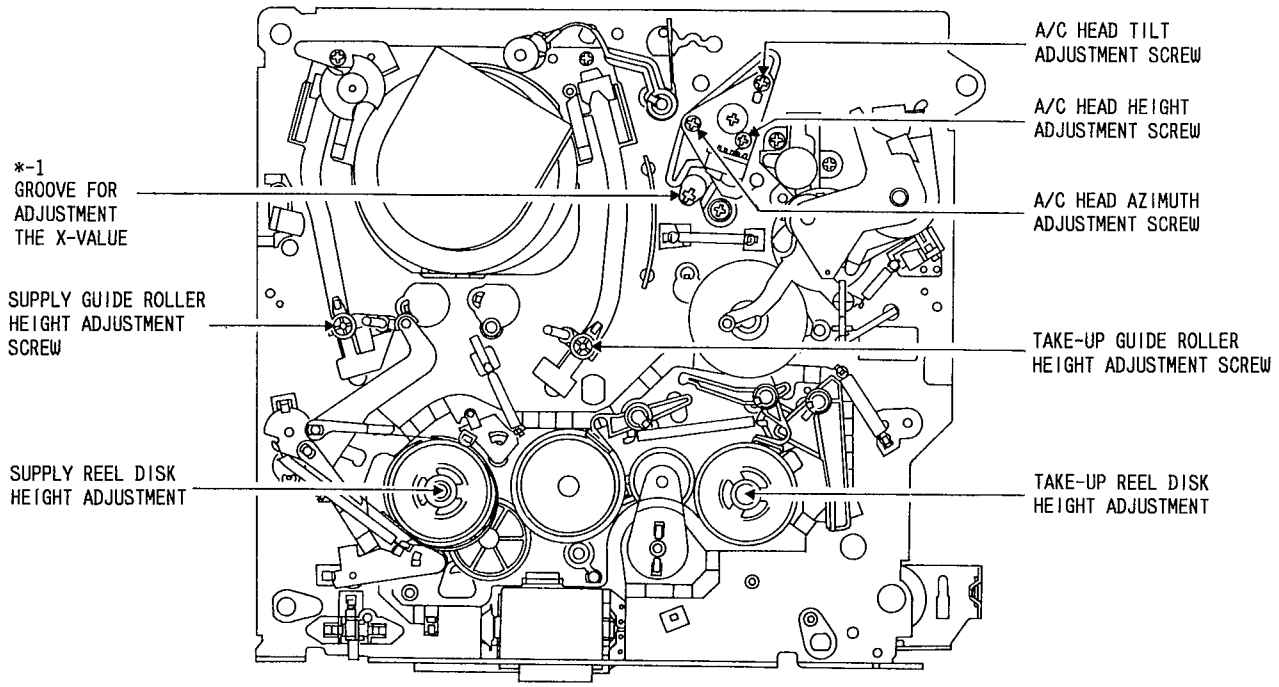
Fig. 5-5

CHAPTER 3 MECHANICAL ADJUSTMENT

1. List of Adjustment Jigs

1. NTSC Alignment Tape [For NTSC] Part No.7099046 	2. 30HMP2-1 Alignment Tape [For NTSC] Part No.7099089 	3. PAL Alignment Tape [For PAL] Part No.7099052 
4. Master Plane Part No.7099279 	5. Torque Gauge Part No.7099039 	6. Torque Gauge Adapter Part No.7099035 
7. Reel Disk Height Jig Part No.7099038 	8. Guide Roller Adjustment Screwdriver Part No.7069064 	

2. Diagram showing Adjustment Locations


A/C HEAD TILT ADJUSTMENT SCREW
A/C HEAD HEIGHT ADJUSTMENT SCREW
*-1 GROOVE FOR ADJUSTMENT THE X-VALUE
A/C HEAD AZIMUTH ADJUSTMENT SCREW
SUPPLY GUIDE ROLLER HEIGHT ADJUSTMENT SCREW
TAKE-UP GUIDE ROLLER HEIGHT ADJUSTMENT SCREW
SUPPLY REEL DISK HEIGHT ADJUSTMENT
TAKE-UP REEL DISK HEIGHT ADJUSTMENT

*-1: For X-value adjustment, refer to the chapter on electrical adjustment in the service manual of each model.

3. Tape Transport Component Adjustments

The tape transport system is a generic term for the path from the supply reel disk to the take-up reel disk via the cylinder (video heads). The tape transport components, especially the components which come into direct contact with the tape, must be kept clean without damage, dust, oil. etc. adhering to the contact surfaces.
When replacing components in the tape transport system, adjust only the new components so the transport system is stabilized.

3-1. Reel disk height adjustment

Purpose: To set the height of reels in the cassette to the specified value so the tape height is determined.

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Master plane (Parts No.7099279) · Reel disk height jig (Parts No.7099038)	1) Remove the cassette loading mechanism. 2) Mount the master plane and place the reel disk height jig on it.	———	· Washers in the supply and take-up reel disks

Adjustment procedure

1) Check that the reel disk is placed between sections A and B of the reel disk height jig.
2) If the above cannot be confirmed, replace the washers (0.5 mm thick) of the reel disk or adjust the number of washers.

[Procedure to replace supply reel disk washers]

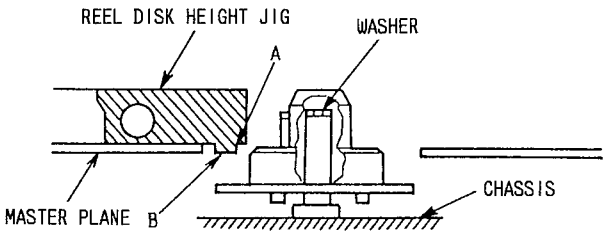
1) Remove the tension arm and tension band.
2) Remove the supply subbrake.
3) Lift the supply reel disk and replace the washers or adjust the number of washers.

[Procedure to replace take-up reel disk washers]

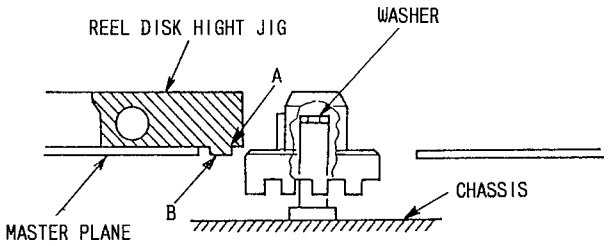
1) Remove brake (R).
2) Lift the take-up reel disk and replace the washers or adjust the number of washers.

Adjustment diagram

[SUPPLY REEL DISK]



[TAKE-UP REEL DISK]



3-2. Tension pole position check

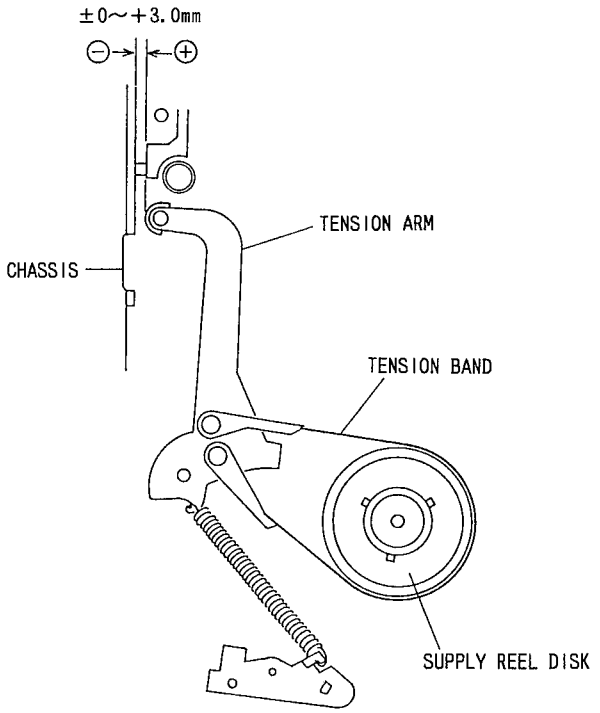
Purpose: To keep the tension of the tape to be supplied constant so the contact between the heads and tape is stabilized.

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
———	———	1) Remove the top cover. 2) Set the VCR to the loading state without inserting a cassette. (See page 4-1)	———

Checking procedure

1) Check that the gap between the tension arm and the end of the chassis is ±0 - +3.0 mm.
2) If the tension pole position drifts greatly after checking, replace the tension band.

Checking diagram



3-3. Guide roller height adjustment

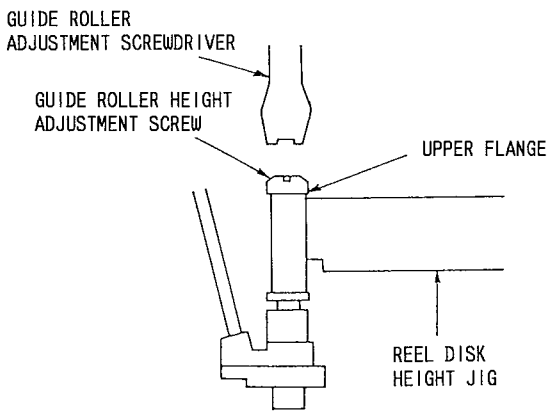
Purpose: To regulate the height of the tape so the bottom of tape runs along the tape guideline on the cylinder.

Coarse adjustment

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
• Master plane (Part No.7099279) • Reel disk height jig (Part No.7099038) • Adjustment screwdriver (Part No.7069064)	1) Remove the cassette loading mechanism. 2) Mount the master plane and place the reel disk height jig on it.	———	Height adjustment screws on the supply and take-up guide rollers

Adjustment procedure
1) Turn the height adjustment screw so the upper flange of the guide roller and the top surface of the reel disk height jig are aligned.
2) Continue the precise adjustment.

Adjustment diagram

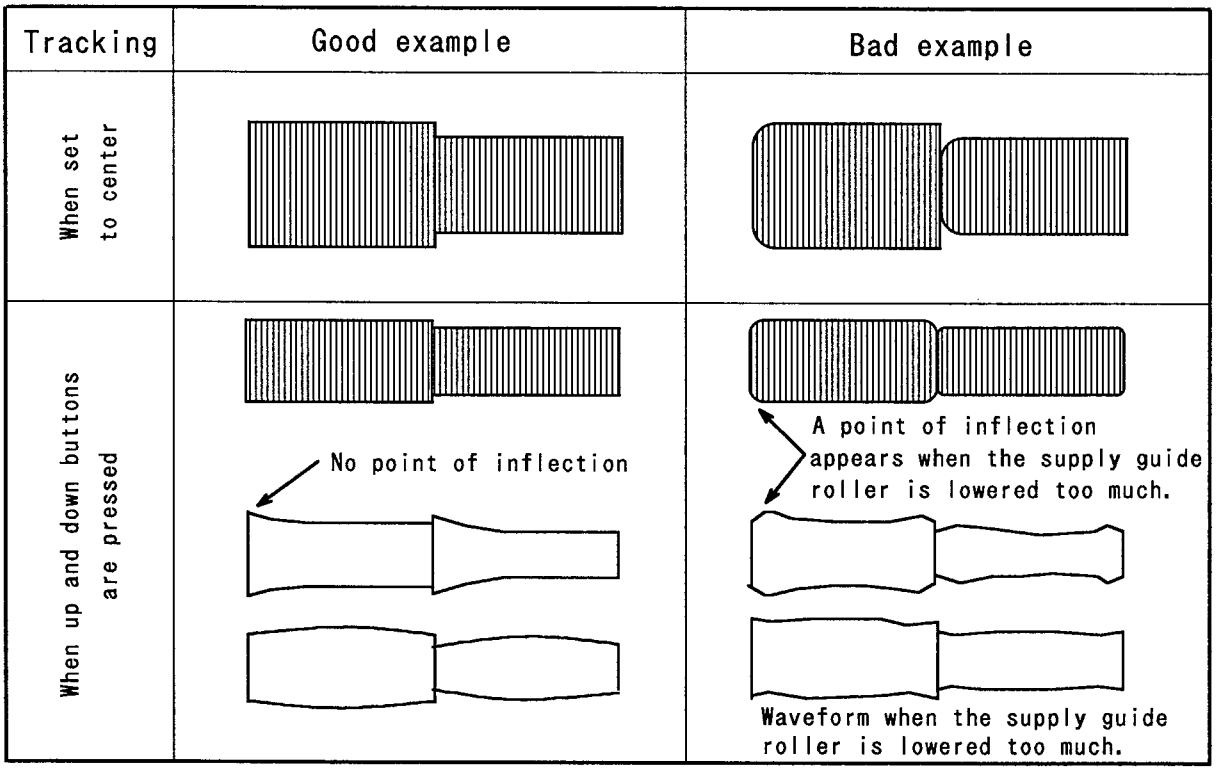


Precise adjustment

Test equipment/jig	Test equipment connection points	State of VCR	Adjustment points
• Oscilloscope	• CH-1: PB FM • CH-2: SW25Hz or 30Hz	• Play alignment tape (Color bars section)	• Guide roller height adjustment screws
• Alignment tape	———		

Adjustment procedure
1) Set the VCR to the X-value adjustment test mode.
2) Play the alignment tape and press the tracking up and down buttons simultaneously to set the tracking to the center.
(When performing this adjustment after replacing the cylinder, set the tracking so the FM output is maximum.)
3) Turn the height adjustment screw little by little so the FM output waveform is flat.
4) Press the tracking up and down buttons and fine adjust the height adjustment screw so the drop in the figure.
5) Release the test mode.

Waveforms


Tracking
Good example
Bad example
When set to center
When up and down buttons are pressed
No point of inflection
A point of inflection appears when the supply guide roller is lowered too much.
Waveform when the supply guide roller is lowered too much.

3-4. Audio/control (A/C) head adjustment

Purpose:	To keep the contact between the tape and head constant so the specified track can be recorded and played back.

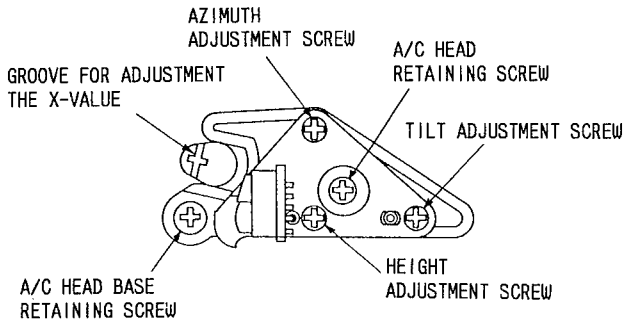
Since the height of A/C head (service part) is adjusted when the VCR leaves the factory, do not turn the height adjustment screw, tilt adjustment screw or azimuth adjustment screw unnecessarily.

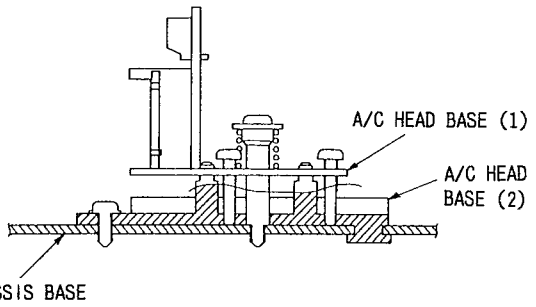
Rough adjustment

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
• Blank tape	———	• Run the blank tape.	• Azimuth adjustment screw • Height adjustment screw • Tilt adjustment screw

Adjustment procedure/adjustment diagrams

1) Load a blank tape and set the VCR to the playback mode.
2) Check that there is no conspicuous curling or riding over of the tape around the A/C head. If conspicuous curling or riding over, etc. occurs, adjust the tilt adjustment screw and azimuth adjustment screw.

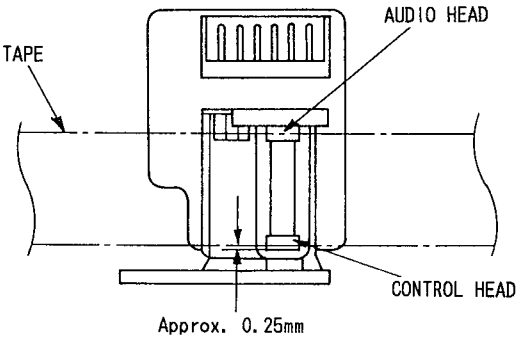




When adjusting the height of the A/C head

Set the VCR to the playback mode. If the height of the A/C head drifts greatly, adjust it by the following procedure.

1) Adjust the height so the tape's bottom edge is approximately 0.25mm above the bottom edge of the control head core.
2) Check that there is no conspicuous curling or riding over of the tape around the A/C head.
3) Continue the precise adjustment.



Precise adjustment

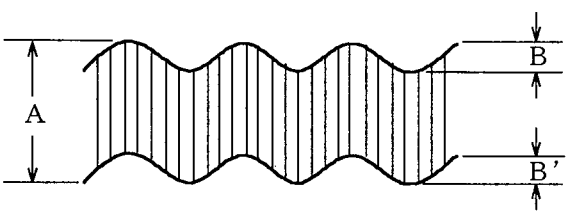
Test equipment/jig	Test equipment connection point	State of VCR	Adjustment points
• Oscilloscope • Alignment tape	• AUDIO output jack ———	• Play alignment tape (Stairsteps section)	• Azimuth adjustment screw • Tilt adjustment screw • Height adjustment screw

Adjustment procedure

1) Adjust the azimuth adjustment screw and tilt adjustment screw alternately little by little so the audio output is maximum and flat (with minimum fluctuations).

Supplement: When the A/C head height has been adjusted, also adjust the height adjustment screw alternately with the azimuth and tilt adjustment screws.

Waveform diagram



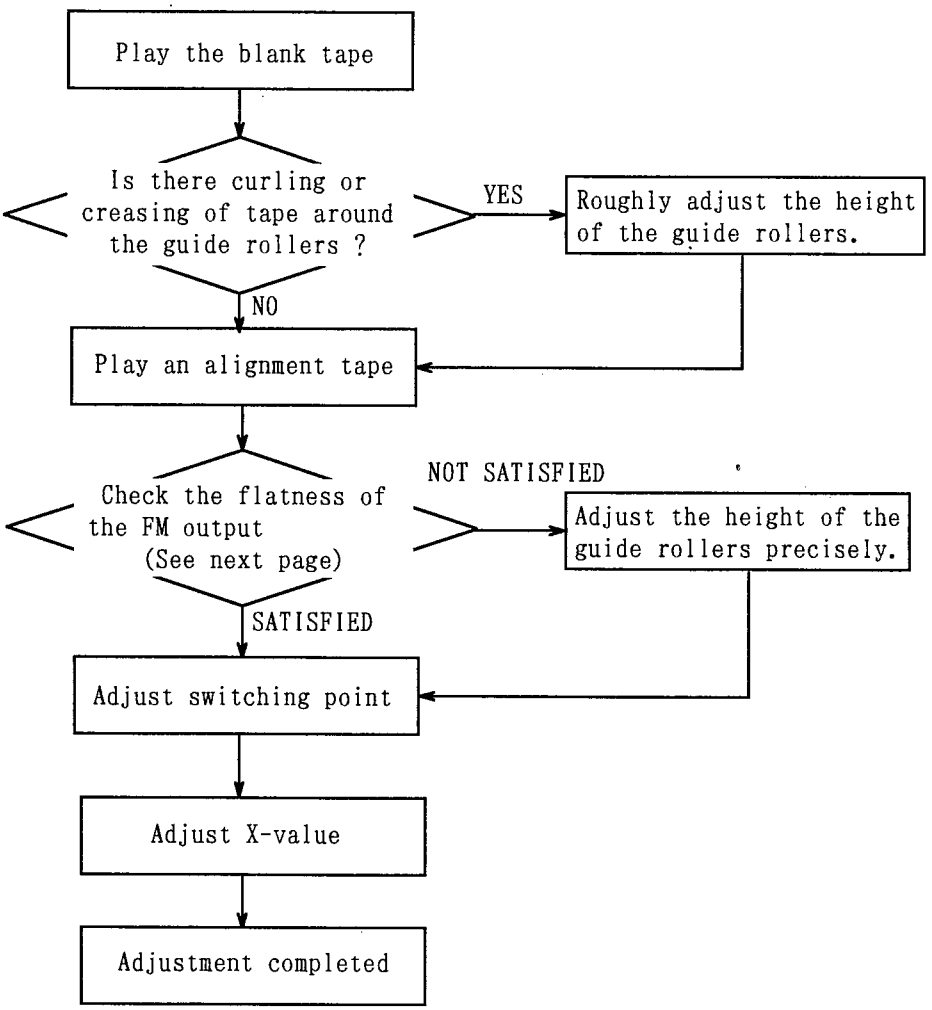
A: Maximum B B': Minimum

3-5. Adjustments after replacing the cylinder

Purpose: To eliminate drift in the relative height with the guide rollers, the X-value, etc. However, this drift is very small when the cylinder has been replaced correctly.

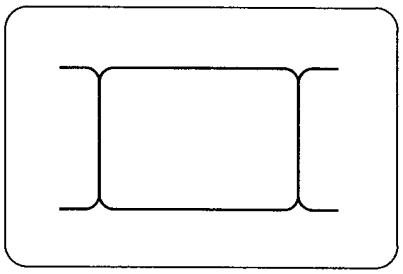
Test equipment/jig	Test equipment connection points	State of VCR	Adjustment points
• Oscilloscope	• CH-1: PB FM • CH-2: SW25Hz or 30Hz	• Run the blank tape	• Guide rollers (precise adjustment on page 3-4) 〔Electrical adjustment〕 • Head switching point • X-value
• Alignment tape	———	• Play alignment tape (Stairsteps section)	
• Blank tape	———		

Adjustment procedure

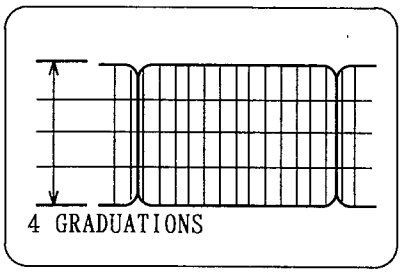

Play the blank tape
Is there curling or creasing of tape around the guide rollers ?
YES
Roughly adjust the height of the guide rollers.
NO
Play an alignment tape
Check the flatness of the FM output (See next page)
NOT SATISFIED
Adjust the height of the guide rollers precisely.
SATISFIED
Adjust switching point
Adjust X-value
Adjustment completed

Checking the flatness and fluctuations of FM output / waveform diagrams

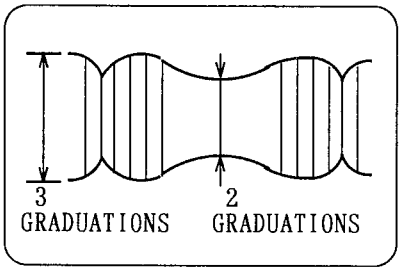
1) Activate autotracking.



2) Finely adjust the voltage level range of the oscilloscope so the FM output is set to 4 graduations.



3) Adjust the tracking so the maximum amplitude of the FM output is set to 3 graduations.
4) Check that the minimum amplitude is more than 2 graduations at this time.



5) Check that the difference between the maximum and minimum level fluctuations is less than 13%.

3-6. Tension/Torque Checks

Purpose: It is necessary to check the tension, torque, compression strength at the tape take-up and moving sections to smooth the running of tape and satisfy the basic performanceof the VCR. Perform this check if the running of tape is not smooth or the tape speed is abnormal.

Test equipment/jigs	State of VCR
• Torque gauge • Torque gauge adapter	• Set the VCR to each operation mode without inserting a cassette. (See page 4-1)

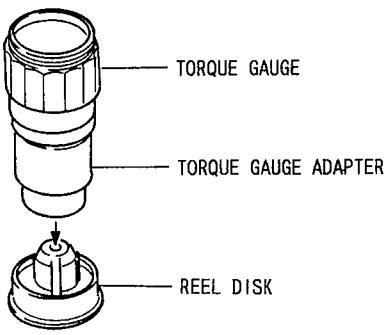
Item	VCR operation mode	Measured reel	Measured value
Main brake torque	Stop (Note)	Supply & take-up reels	100 ~ 300 g·cm
Slack removal torque	Unloading	Supply reel	95 ~ 180 g·cm
Fast forward torque	Fast forward	Take-up reel	400 g·cm or more
Rewind torque	Rewind	Supply reel	400 g·cm or more
Take-up torque	Playback	Take-up reel	45 ~ 75 g·cm
Back-tension torque	Fast forward/Rewind	Supply & take-up reels	5 ~ 20 g·cm
Playback back-tension torque	Playback	Supply reel	25 ~ 36 g·cm
Reverse search torque	Reverse search	Supply reel	95 ~ 250 g·cm
Reverse play torque	Reverse play	Supply reel	95 ~ 150 g·cm
Slow torque	Slow	Take-up reel	30 ~ 75 g·cm
Take-up brake torque	Reverse search	Take-up reel	65 ~ 100 g·cm

Checking procedure

Mount the torque gauge and torque gauge adapter and hold the torque gauge with your fingers for measurement.

Note : Measure in the loading stop-2 state. (See next page.)

Adjustment diagram



CHAPTER 4 MECHANISM OPERATION CHECK AND MAINTENANCE/INSPECTION

Mechanism Operation Check

Check the mechanism operation after dismantling and adjusting the mechanical block.
Check the operation after setting the mechanism to the loading state without loading a cassette.
If the mechanism does not operate normally, recheck the components and sections related to the area of the abnormality.

1. Method to set the VCR to the loading state without loading a cassette

Unplug the power cord from the AC outlet.

↓

Remove the top cover and front panel.

↓

Remove the US front loading (FL) mechanism.

↓

Cover the end sensors (sections A in the figure on the right) with black masking tape, etc. to shut off light.

↓

Plug the power cord into an AC outlet again and turn the VCR on.

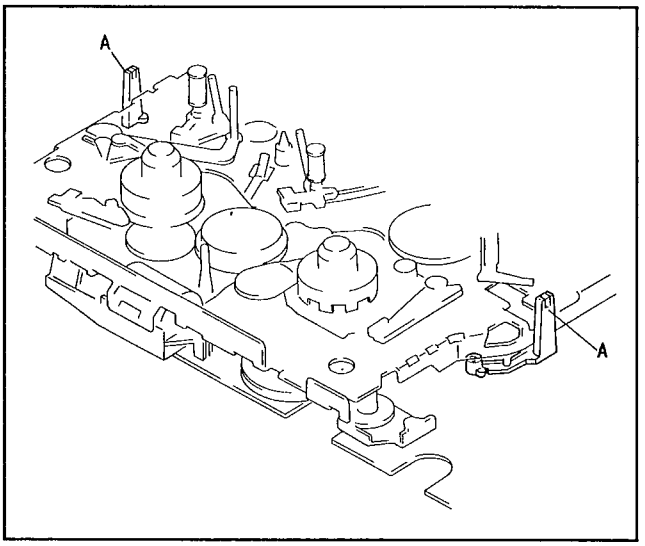
↓

The cylinder rotates and the guide rollers are set to the loading state.
The VCR stands by in the LOADING-STOP 1 mode (mode switch position: 6). *-1

→ Proceed to the operation check on the next page.

↓

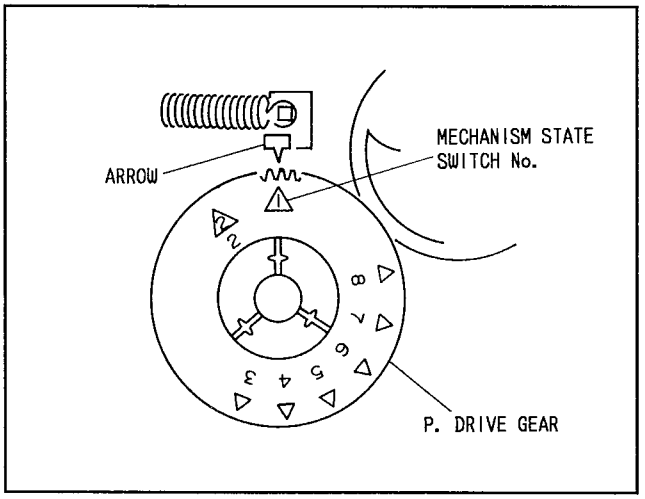
When the stop mode continues for one minute, the pressure roller and tension arm will no longer be pressed. The VCR enters the LOADING-STOP 2 mode (mode switch position:7). After five more minutes, the cylinder is stopped.



*-1: The VCR can accept the inputs of each mode in this state. However, rewinding can be done for no more than several seconds and the power is shut off because the take-up reel disk is in the stop state and reel pulses cannot be detected. Turn the take-up reel disk manually for rewind operation.

[Method to check the position of the mechanism mode switch]

Check the mode position by observing the arrow on the spring hook which is positioned in front of the A/C head and the arrow no. on the P. drive gear.



2. Checking the operation in each mode

Operation in each mode	Mode switch position
LOADING-STOP 1 mode	6

Recording/playback modes

Press the record or playback button of the VCR. The take-up reel disk starts to turn.	6
Press the stop button of the VCR. The take-up reek disk stops.	6

* To set to the record mode, pull the safety arm forward.

Still play mode

Press the playback button of the VCR. The take-up reel disk starts to turn.	6
Press the pause button. Take-up reel disk and capstan stop.	5
Press the stop button. The take-up reel disk and capstan turn forward and then stop.	6

Record pause mode

Press the record button of the VCR. The tension arm is released and the supply reel disk turns in reverse.	3
The tension arm is pressed and the take-up reel disk and capstan shaft to turn forward.	6
Press the pause button. The tension arm is released and the supply reel disk turns in reverse, then the take-up reel disk and capstan shaft turn forward. When the start of a program is located, the VCR enters the pause mode.	3 ↓ 5

Rewind mode

Press the rewind button. The tension arm is released and the T-brake is applied.	6 ↓ 3
The reel disk starts to turn.	3
Press the stop button. The T-brake is released and the tension arm is pressed.	6

After completing the check, be sure to reset the VCR to the original state by the following procedure.

1) Turn the VCR off.
2) Remove the masking tape, etc. from the supply and take-up end sensors.
3) Unplug the power cord from the AC outlet to reset the microprocessor(s).
4) Install the cassette loading mechanism to complete the work.

Maintenance/ Inspection Procedure

1. Necessity of Maintenance and Inspection

The recording density of a VCR is much higher than that of an audio recorder. A VCR uses very precise components to ensure compatibility with other VCRs. If any of mechanical components are worn or dirty, the symptoms will be the same as if the VCR has malfunctioned. To ensure a good picture, it is necessary to clean and lubricate the mechanism periodically and replace worn-out components.

2. Scheduled Maintenance and Inspection

Schedules for maintenance and inspection are not fixed because they vary greatly according to the way in which the customer uses the VCR and the environment in which the VCR is used. But, in general home use, a good picture is ensured if inspection and maintenance are done every 1,000 hours of use. Table 1 shows the relation between the time used and inspection period.

3. Before Determining that the VCR is Faulty

When a VCR has been used for over 1,000 hours, the symptoms shown in Table 2 may be seen in the playback picture. These faults may be remedied by cleaning and lubricating mechanical components. Check the hours for which the VCR has been used referring to Table 1. If you determine that the VCR is ready for inspection and maintenance, check the inspection locations shown in Table 2.

Caution: If the VCR cannot be restored to normal operation after cleaning components marked "○" in the part replacement column, they are degraded. Replace them.

Table 1

Average hours used per day	When inspection is necessary: 1 year	18 months	3 years
One hour			
Two hours			
Three hours			

Table 2

Symptom	Cause	Inspection location	Replacement
Color beats	Dirt on full erase (FE) head	Clean the surface of FE head which is in contact with tape	
Poor S/N, no color	Dirt on video heads (or they are degraded)	Clean video heads	○
Vertical jitter, horizontal jitter	Dirt on video heads and cylinder. Dirt in tape transport system.	Clean video heads and cylinder. Clean guide rollers and inclined guides.	
Low volume or sound distorted	Dirt on audio/control (A/C) head	Clean the surface of the A/C head which is in contact with tape	○
Tape is slack or does not run	Dirt on pressure roller	Clean pressure roller and capstan shaft	○

Inspection Locations

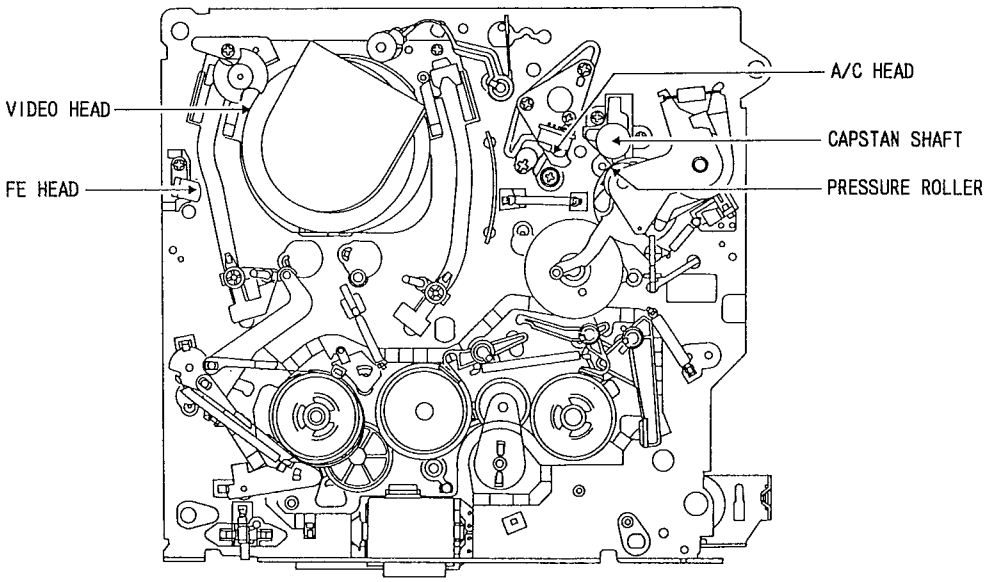


Fig. 1 Inspection Location Diagram

4. Tools Needed for Inspection and Maintenance

(1) Head cleaning kit (Fig. 2)
(2) Grease and oil for maintenance (Fig. 3)
(3) Alcohol
(4) Gauze

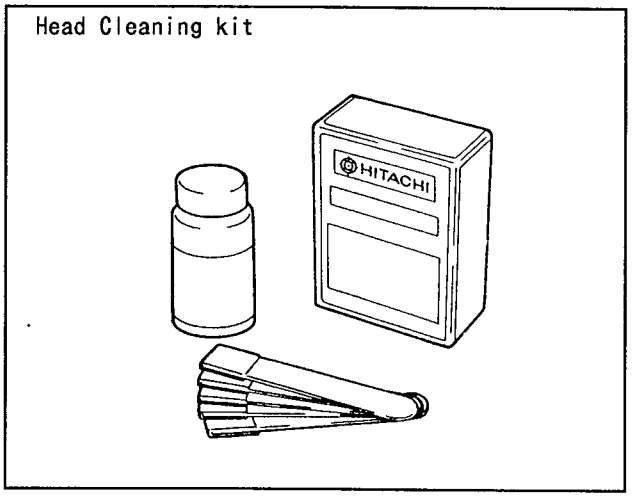


Fig. 2

Table 3 Locations for Use of Oil and Grease for Maintenance

Name	Lubricating or greasing location
Sonic Slidas Oil (#1600)	Lubricate low-speed rotating sections
Molicoat (PG-641)	Coat metal and mold sections under light load

5. Cleaning Procedure

1) Cleaning the video heads (Fig. 4)
First use a cleaning tape. If the dirt on the heads is too stubborn to be removed by the tape, use the head cleaning kit to clean the heads by the following procedure.
Moisten the cleaning stick with cleaning fluid and touch the head tip with the stick and gently turn the head (rotate the cylinder) to the left and right. (Do not move the stick vertically and be sure that only the chamois leather on the stick touches the head tips. Otherwise, the heads may be damaged.) After cleaning, thoroughly dry the heads, then run the tape. If cleaning fluid remains on the heads, the tape may be damaged when it comes into contact with the heads.
2) Cleaning the tape transport system (Fig. 3)
Moisten gauze with alcohol and use it to clean components ① - ⑬ (see "cleaning the video heads" for component ⑦).
Caution: When cleaning, take great care not to damage tape transport components or deform them by applying excessive force.

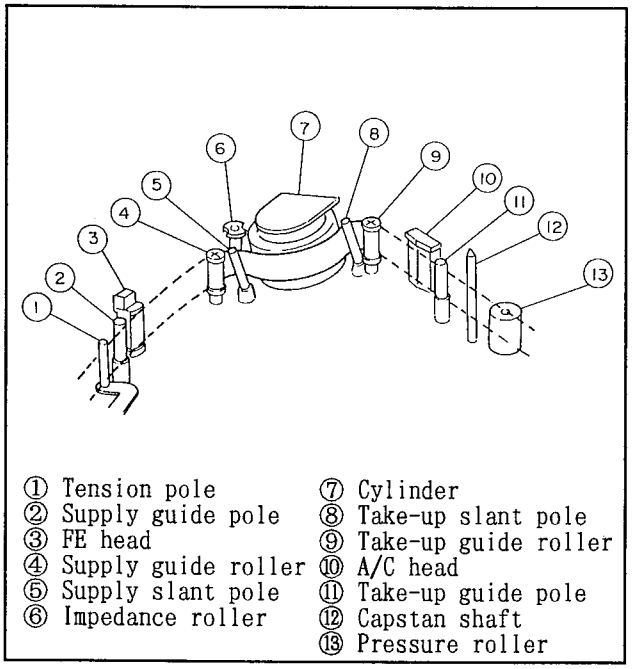


Fig. 3

6. Lubricating and Greasing

1) Lubricating guidelines
Use the oiler to apply one or two drop of Sonic Slidas oil. Make sure not to use too much oil because it may spill over and leak out, coming into contact with rotating parts and causing slippage or other problems. If too much oil is applied, wipe clean using gauze moistened with alcohol.
2) Greasing guidelines
Apply grease (Molicoat) with a stick or brush. Do not use too much grease. It may come into contact with the tape transport or drive system. Wipe off any excess and clean with gauze moistened with alcohol.
3) Oil or grease the specified locations referring to Table 4 on the next page.

[Cleaning method]

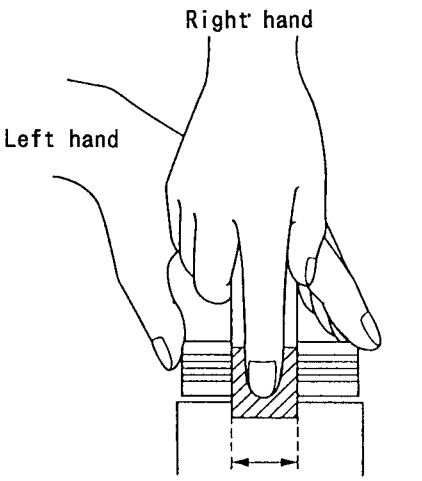


Fig. 4

7. Maintenance/Inspection Schedules of Mechanical Parts

Caution: This timetable shows the period when each component is required to be maintained and inspected. Use the following table as a reference as the maintenance/inspection period depends on how the unit is used and the environment in which it is used.
For components indicated as C/R, replace components if the VCR does not become normal after being cleaned.

Table-4

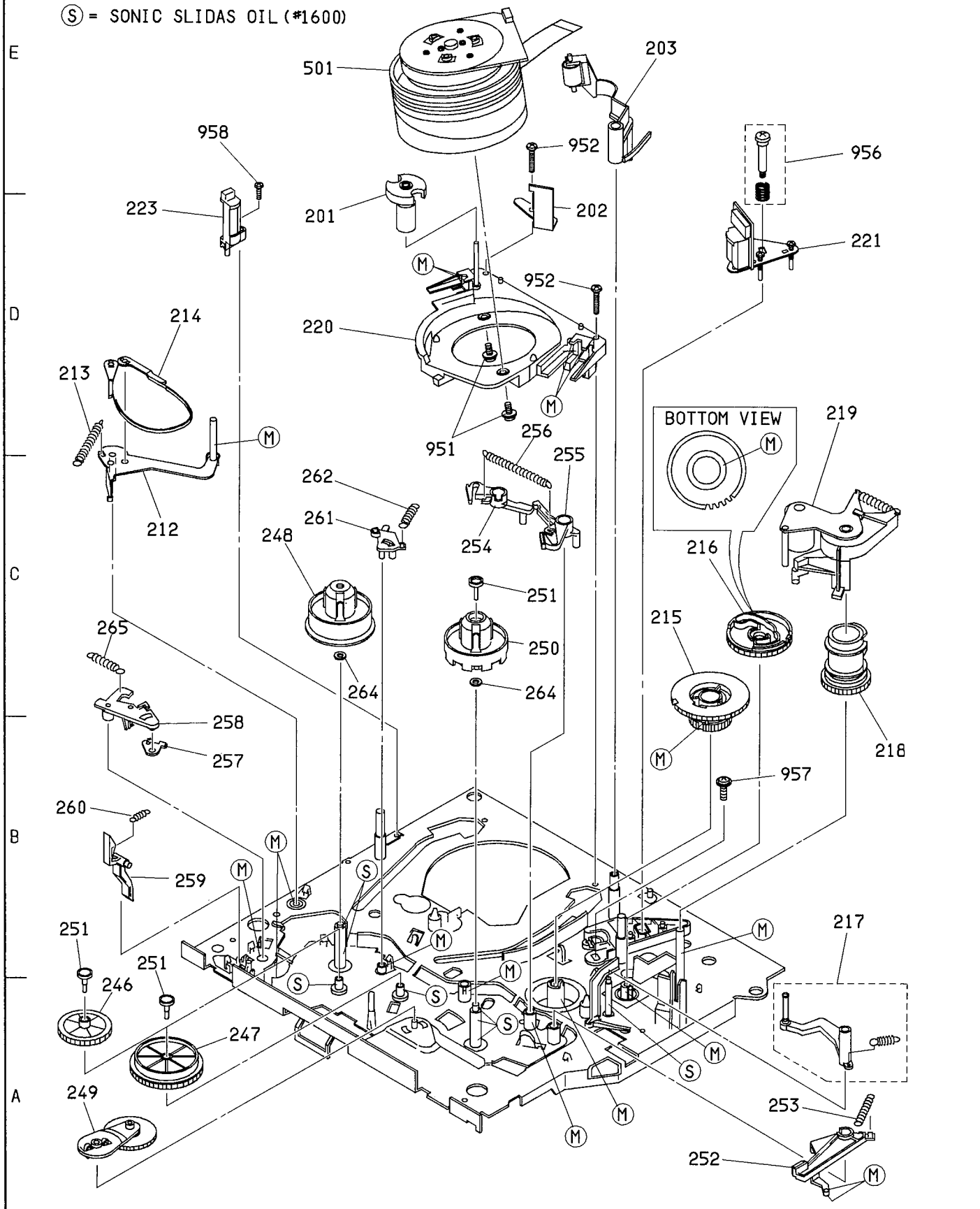
Component	hours				
	1000	2000	3000	4000	5000
Video heads (cylinder motor)	C／R	C／R	C／R	C／R	C／R
Audio/control (A/C) head	C	C／R	C	R	C
Full erase (FE) head	C	C	C	R	C
Supply guide roller	C	C	C／R	C	C
Take-up guide roller	C	C	C／R	C	C
Tension band		R		R	
Tension arm	C	C	C	C	C
Supply reel disk		C		C	
Take-up reel disk		C		C	
Pressure roller assembly	C	R	C	R	C
Drive belt		C		C	
Capstan motor	C	R	C	R	C
Loading motor				R	
Cylinder motor		R		R	
Mechanism state switch				(R)	
Idler gear 1		R		R	
Idler gear 2		R		R	
FR gear		R		R	
Supply slant pole	C	C	C	C	C
Take-up slant pole	C	C	C	C	C
Impedance roller	C	C	C	C	C
Guide pole	C	C	C	C	C
Tape guideline on cylinder	C	C	C	C	C
Brake (L)	C	C／R	C	C／R	C
Brake (R)	C	C／R	C	C／R	C
HC arm					(R)
Shaft and bearing of supply reel disk		S		S	
Shaft and bearing of take-up reel disk		S		S	
Shaft and bearing of idler gear 1		S		S	
Shaft and bearing of idler gear 2		S		S	
Shaft of pulley assembly		S		S	
Shafts of torque change gear and FR drive gear		S		S	
Shaft of pressure roller arm		M		M	
Guide roller base moving sections in chassis					M
Surface of contact between cylinder motor base and guide roller base during loading					M
Surface of contact between tension arm and supply guide roller base					M

R: Replacement of parts
C: Cleaning
S: Lubricating oil (Sonic Slidas oil)
M: Coating grease (Molicoat)

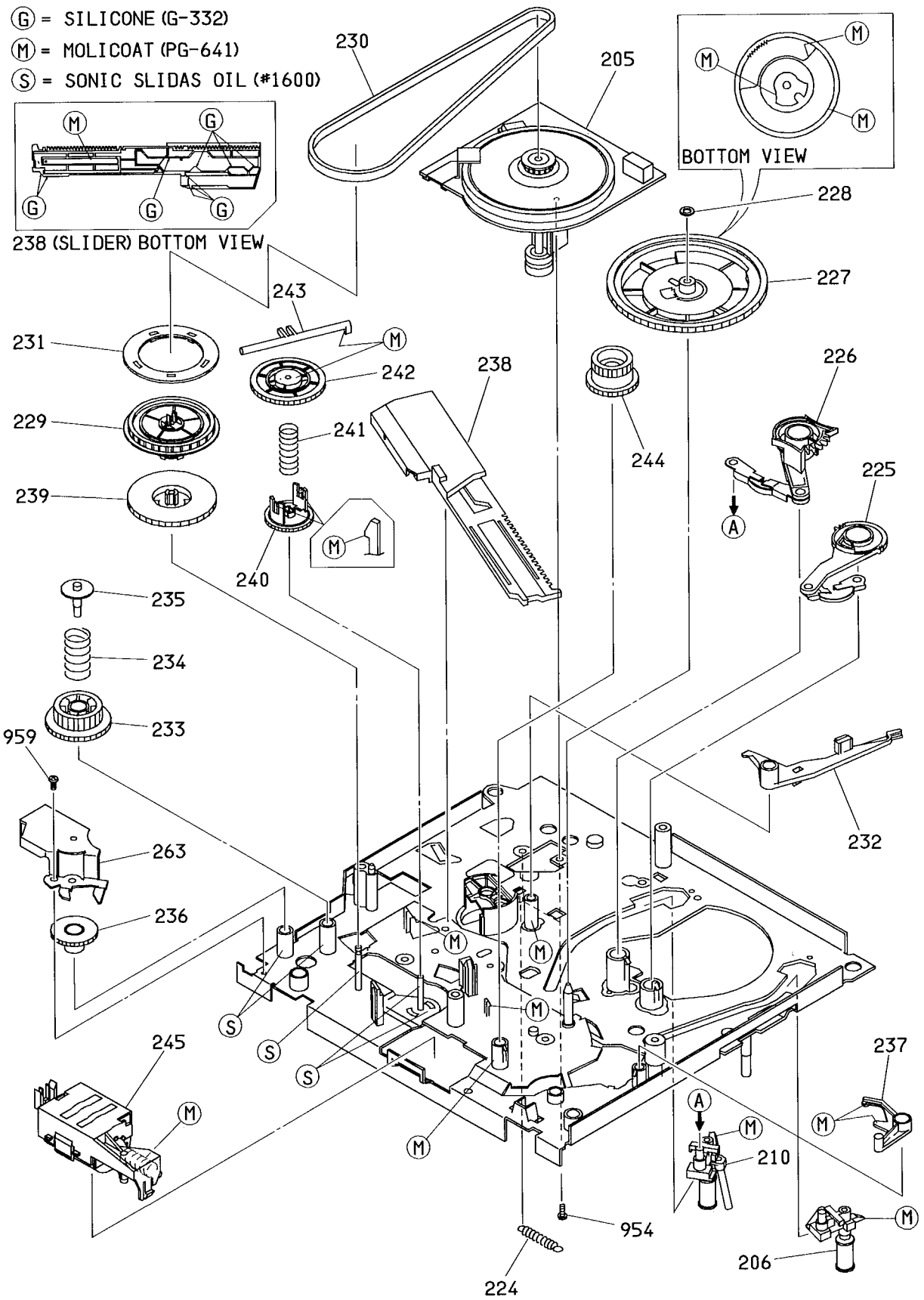
1. US-MECHANISM (TOP VIEW) SECTION

Ⓜ = MOLICOAT (PG-641)

Ⓢ = SONIC SLIDAS OIL (#1600)



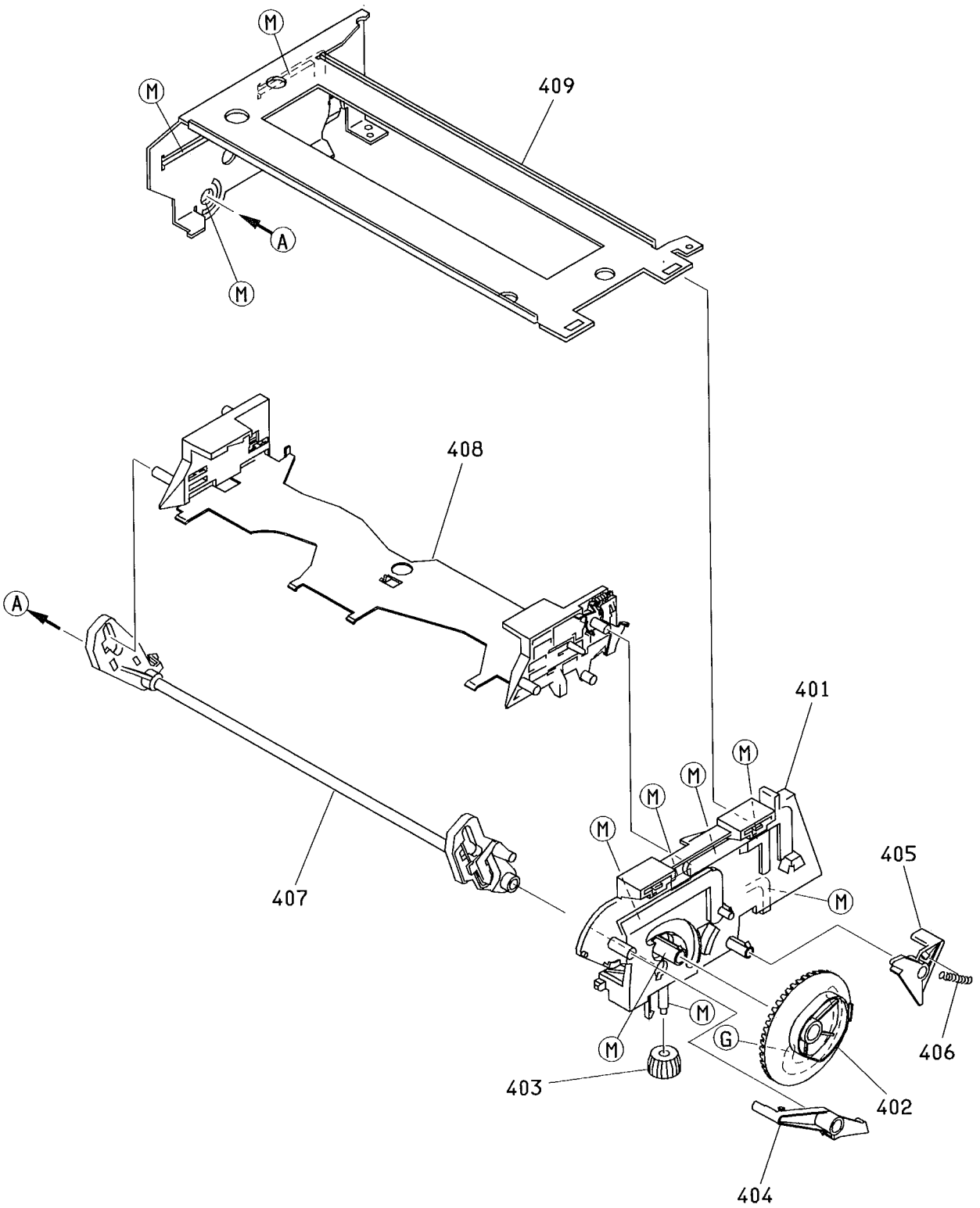
2. US-MECHANISM (BOTTOM VIEW) SECTION



3. US-FL MECHANISM SECTION

Ⓜ = MOLICOAT (PG-641)

Ⓖ = SILICONE (G-332)



Identifications of Components in US Mechanism

Index No.	Component
201	Impedance roller
202	Impedance plate
203	Head cleaning (HC) mechanism
204	FL mechanism assembly
205	Capstan motor
206	Guide roller base (I) assembly
210	Guide roller base (O) assembly
212	Tension arm
213	Spring
214	Tension band
215	P. drive gear
216	PR idler gear
217	P. out arm
218	Spiral gear
219	Pressure roller arm
220	Cylinder base
221	A/C head assembly
223	FE head
224	Spring
225	Loading gear (L)
226	Loading gear (R)
227	Cam gear
228	Poly-slider washer
229	Pulley assembly
230	Drive belt
231	Flange
232	FS brake
233	FL change gear
234	Spring
235	Spring hook
236	FL idler gear
237	Take-up operation arm
238	Slider
239	Transmission gear
240	FR drive gear
241	Spring
242	Torque change gear
243	Torque change arm
244	LM wheel gear
245	Loading motor assembly
246	Idler gear 1
247	Idler gear 2
248	Supply reel disk
249	FR arm
250	Take-up reel disk

Index No.	Component
251	Stopper
252	Take-up brake
253	Take-up brake spring
254	Brake (L)
255	Brake (R)
256	Spring
257	Jog gear
258	Jog arm
259	Safety arm
260	Spring
261	Supply subbrake
262	Spring
263	Base bracket
264	Washer
265	Spring
401	Side bracket (R)
402	Bevel gear
403	FL gear
404	Door arm
405	Switch arm
406	Spring
407	Drive arm
408	Cassette holder
409	Side bracket (L)
501	Cylinder motor
951	Screws (3 x 8)
952	DT screws (2.6 x 10)
953	DT screws (2.6 x 6)
954	BT screws (2.6 x 6)
956	Screws
957	Screws (M2.6)
958	DT screws (2.6 x 8)
959	DT screws (2.6 x 5)

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